SOSTITUZIONE DEI COASSIALI DI FREQUENZA INTERMEDIA CON LINK FIBRA OTTICA E CARATTERIZZAZIONE DEI RELATIVI SEGNALI SULL' ANTENNA 32m DI MEDICINA

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IRA 472/13

Il giorno 19 settembre 2013 sono stati definitivamente installati quattro link in fibra ottica della Optel s.r.l. [1] dopo che dal mese di agosto era stato validato, con osservazioni VLBI astronomiche e geodinamiche, il funzionamento di un solo link.
Il link sostituisce il cavo coassiale di discesa IF usato dagli albori della parabola 32m, sostituito con uno nuovo nel 2003 ma sempre del tipo coassiale, e consente di portare in sala controllo, ove risiedono i back-end, quattro segnali IF della larghezza di banda massima di 2 GHz (tra 100 e 2100 MHz per la precisione).
Al momento i primi due link, etichettati come 1 e 2, possono instradare le due polarizzazioni uscenti da ogni ricevitore monofeed presente in antenna. I due ulteriori, etichettati come 3 e 4, instradano le ulteriori due polarizzazioni provenienti dal secondo ricevitore del Dual-feed banda K installato quest'anno.

La nomenclatura assegna i link 1 e 3 per le LCP e i link 2 e 4 per le RCP.

Lo schema a blocchi di Fig. 1 rappresenta le connessioni ora presenti.

Le misure effettuate il giorno successivo, 20 settembre, riguardano l'acquisizione di tutti i segnali IF provenienti dai ricevitori attualmente presenti in antenna (4.3-5.8; 5.9-7.1; 18-26.5 GHz) in fuoco secondario. Il giorno 10 ottobre le misure sono state completate con le bande in fuoco primario (1.35-1.45; 1.6-1.7GHz; 2.2-2.36; 8.18-8.98 GHz. L'analizzatore di spettro è stato collegato direttamente alle uscite sma per i link 3 e 4, a due cavetti in rame, connettorizzati sma collegati alle uscite sma per i link 1 e 2.

La mappa delle acquisizioni per il fuoco secondario è riportata nella tabella che segue (Tab. 1) evidenziando le bande cielo corrispondenti alle IF misurate in funzione del valore di primo OL (synt HP). Una mappa simile non è necessaria per le acquisizioni di fuoco primario, in quanto i valori di OL sono unici e fissi per ciascuna banda di frequenza.

	OL1 (GHz; dBm)										
	12; 0	13; 0.6	14; 0.8	15; 1	16; 1.5	17; 2.6	18; 3	8.1; 14	8.6; 14	6.5; 14	7.2; 14
Banda RF (GHz)	18-20	19-21	20-22	21-23	22-24	23-25	24-26	5.9-6.7	6.4-7.2	4.3-5.1	5.0-5.8

Tab. 1 Mappa delle bande acquisite

Nei grafici relativi alle figure da 2 a 37 sono riportate le IF che l'analizzatore di spettro ha rilevato per i ricevitori di fuoco secondario. Notare come in ciascun grafico è riportato, insieme con la data e l'ora, il nome del file da cui proviene.
Per i file del ricevitore banda K,
prima cifra=horn0 o 1,
seconda lettera=banda,
terza cifra= IF1 o IF2
ultime due cifre= OL1 (in GHz)

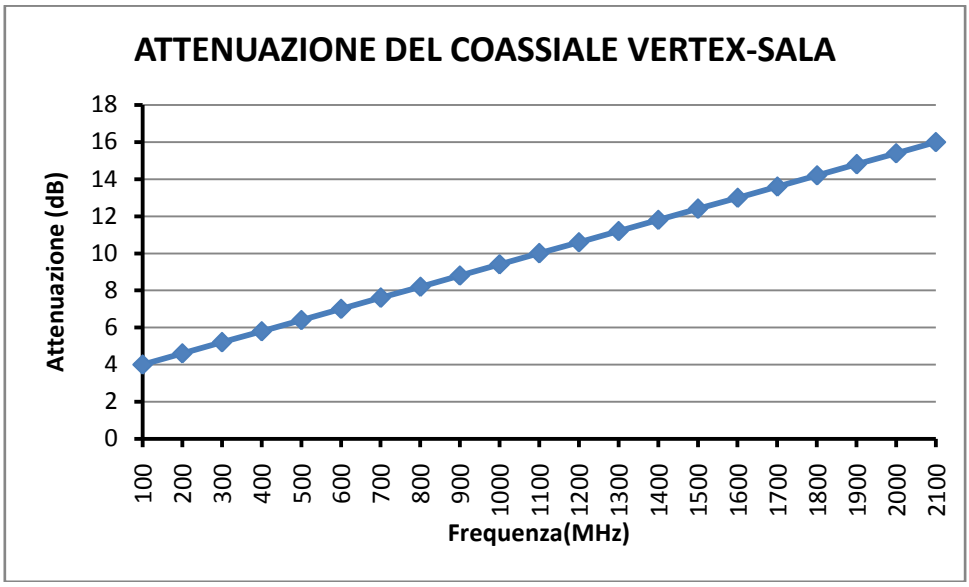
I grafici mostrano tre marker, il marker 1 e 3 sono stati impostati alle frequenze di inizio e fine banda IF nominale, marker1=100MHz per tutti e marker3=2100MHz per il banda K, =900MHz per banda CH e C).

Nei grafici relativi alle figure da 38 a 45 sono riportate le IF che l'analizzatore di spettro ha rilevato per i ricevitori di fuoco primario.

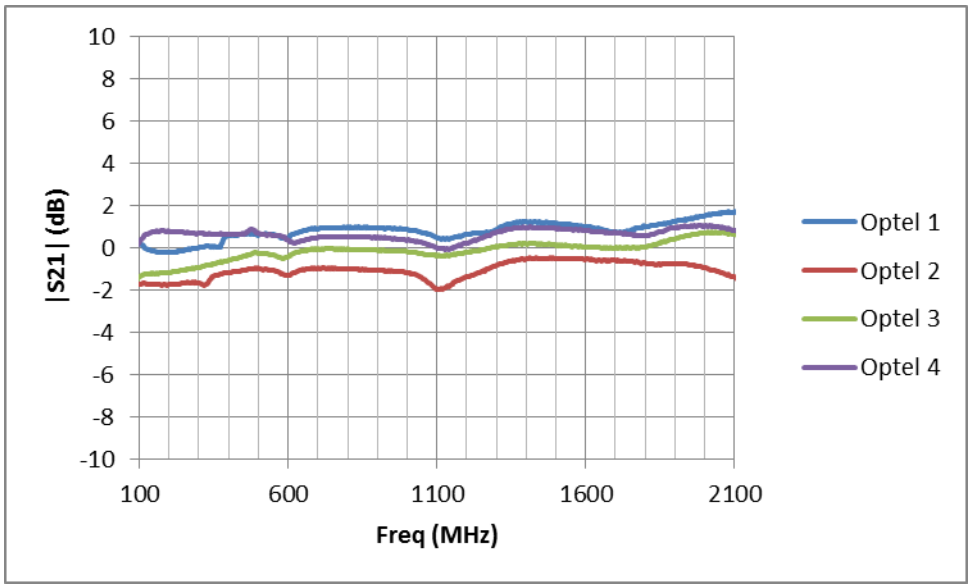
Durante le misure l'antenna è sempre stata mantenuta in posizione di parcheggio.

Per confronto si riporta l'attenuazione del cavo coassiale di discesa vertex room-sala controllo in funzione della frequenza. La curva è una interpolazione lineare di attenuazioni misurate a 500 (A=6.4dB) e 900 MHz (A=8.8dB). La retta interpolante è,

A(dB)=0.006 (dB/MHz)+3.4dB



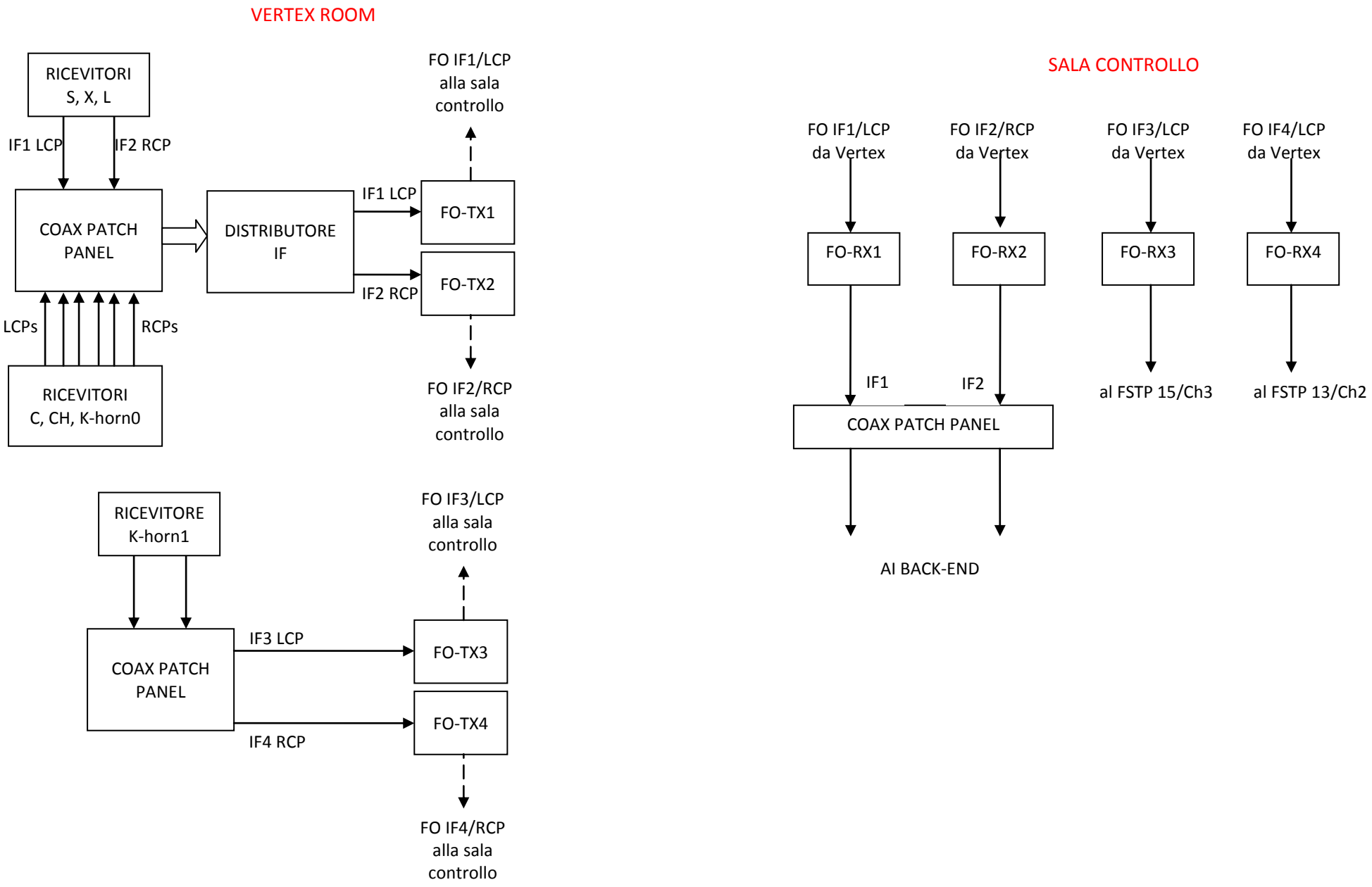
Per confronto si riporta la funzione di trasferimento (modulo del guadagno) misurata in laboratorio dei quattro link installati. La misura è stata fatta interponendo 3 patch FC/APC da 2 metri ciascuna in modo da tenere conto già delle perdite introdotte dai connettori ottici nei rack in vertex e in sala controllo. La perdita ottica dei link in laboratorio rispetto a quando sono installati sull'antenna differisce di soli 0.2dB o (0.4dB RF), pari all'attenuazione dei 90m in fibra dalla Vertex Room alla Control Room.



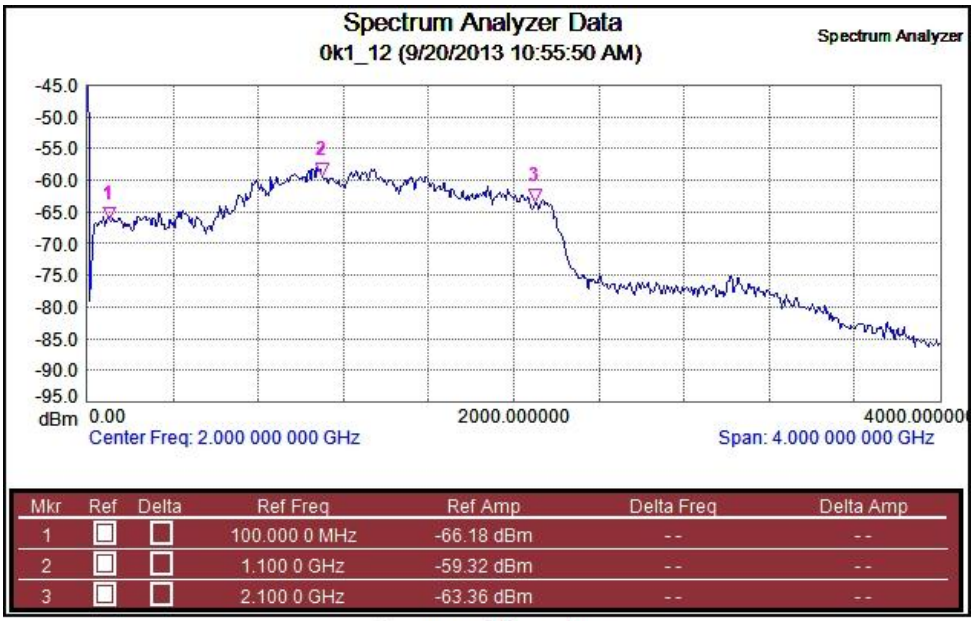
	Optel 1	Optel 2	Optel 3	Optel 4	IRA specs
G mean (dB)	0.73	-1.23	-0.31	0.48	0
ΔG (dB)	±0.97	±0.76	±1.04	±0.58	±1

Tab. 2

Fig. 1 Schema a blocchi delle connessioni



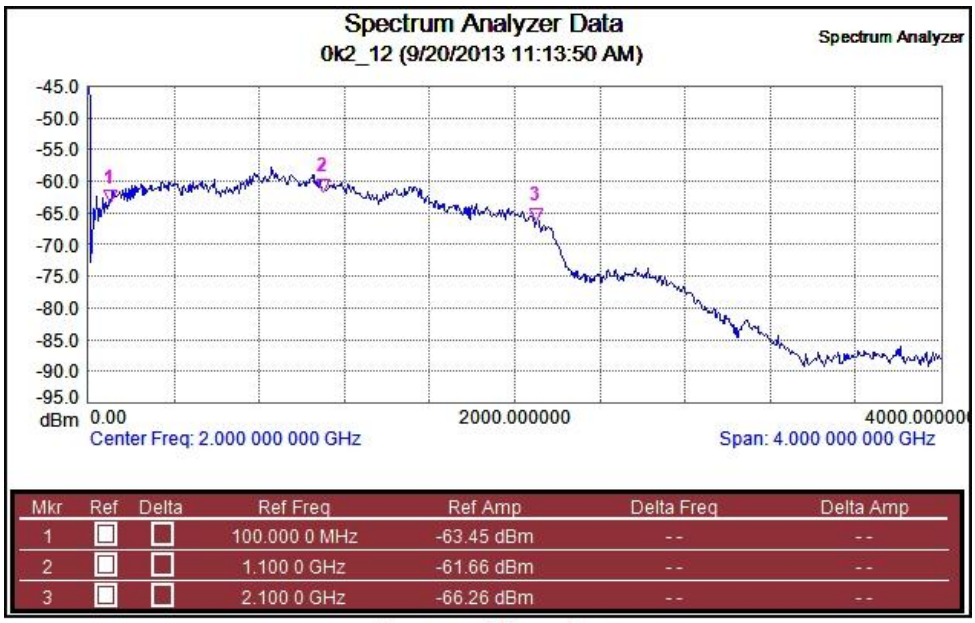
RICEVITORE DUAL FEED BANDA K



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 10:55:50 AM
Start Frequency	0.000 000 Hz	Device Name	

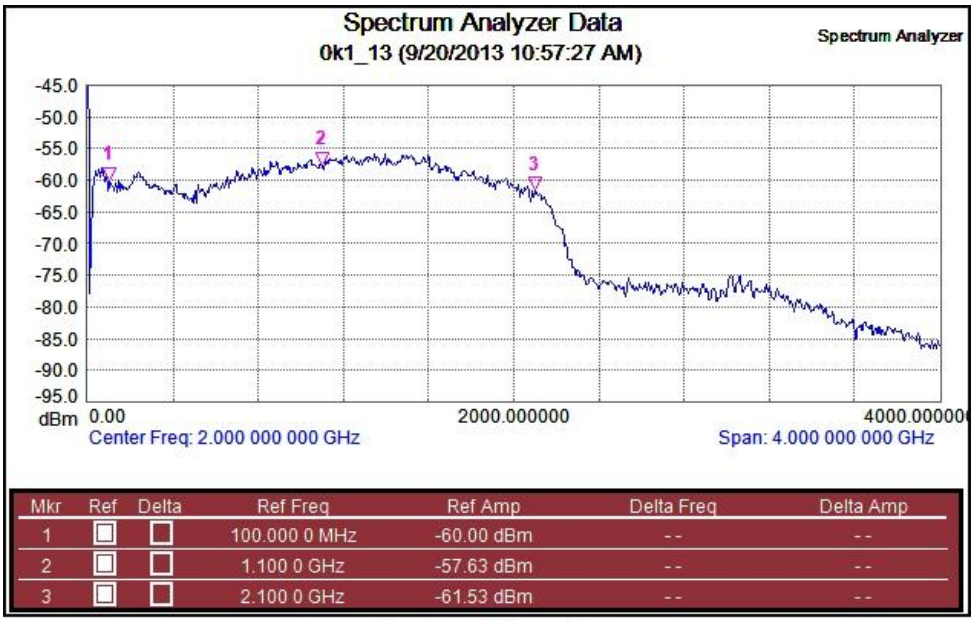
Fig. 2 18-20GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:13:50 AM
Start Frequency	0.000 000 Hz	Device Name	

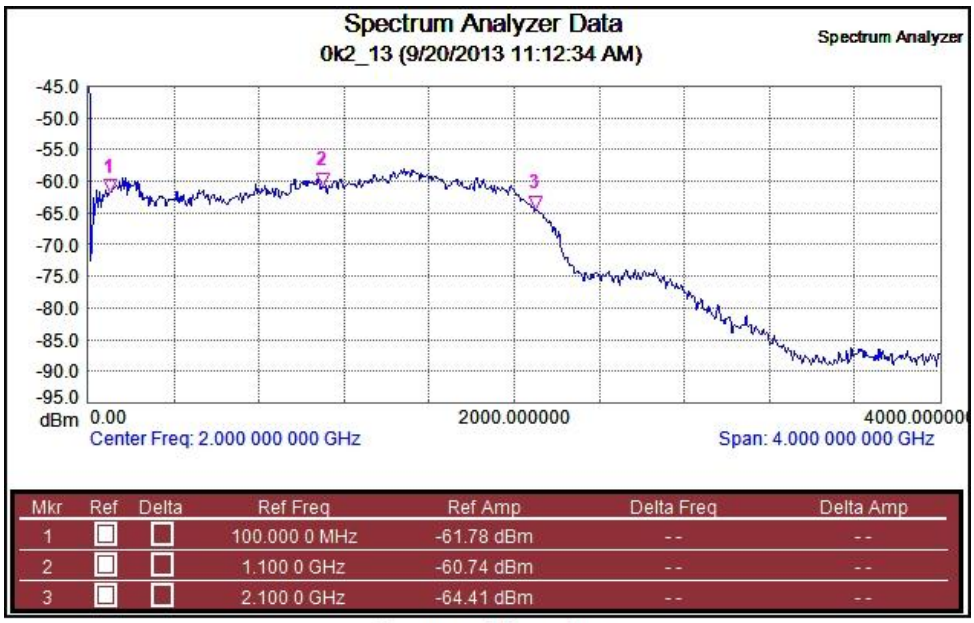
Fig. 3 18-20GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 10:57:27 AM
Start Frequency	0.000 000 Hz	Device Name	

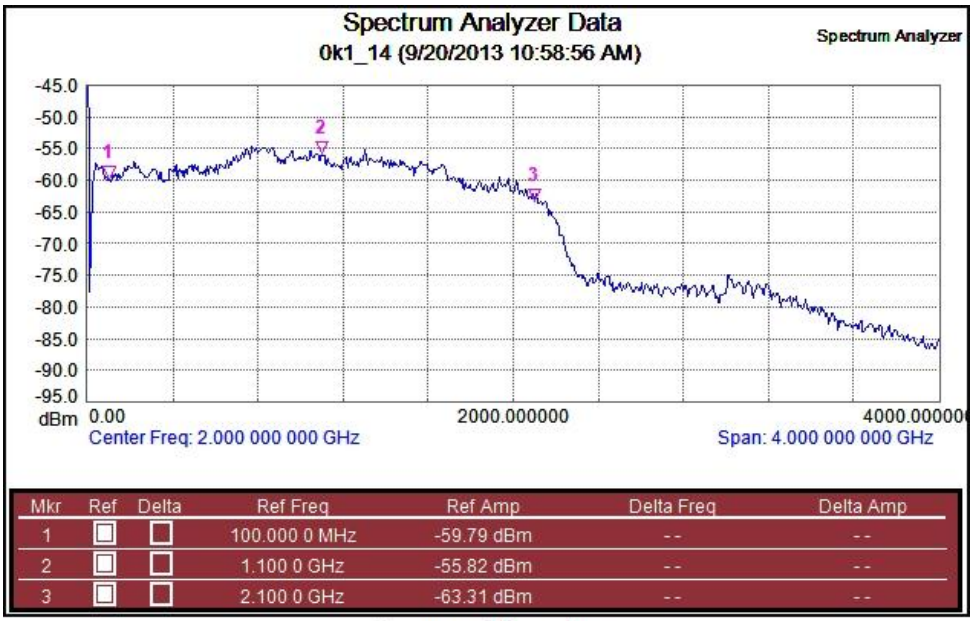
Fig. 4 19-21GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:12:34 AM
Start Frequency	0.000 000 Hz	Device Name	

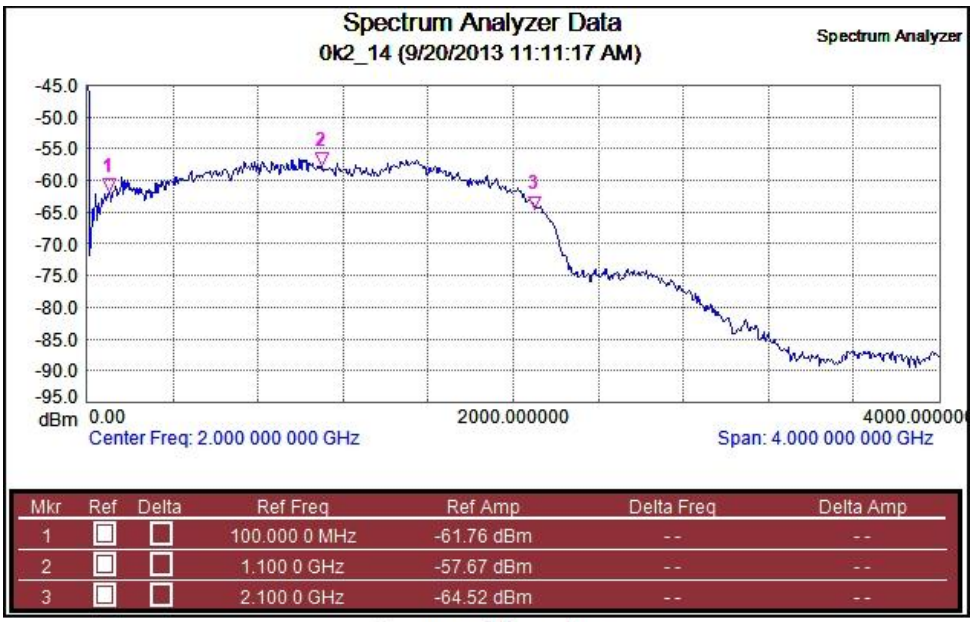
Fig. 5 19-21GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 10:58:56 AM
Start Frequency	0.000 000 Hz	Device Name	

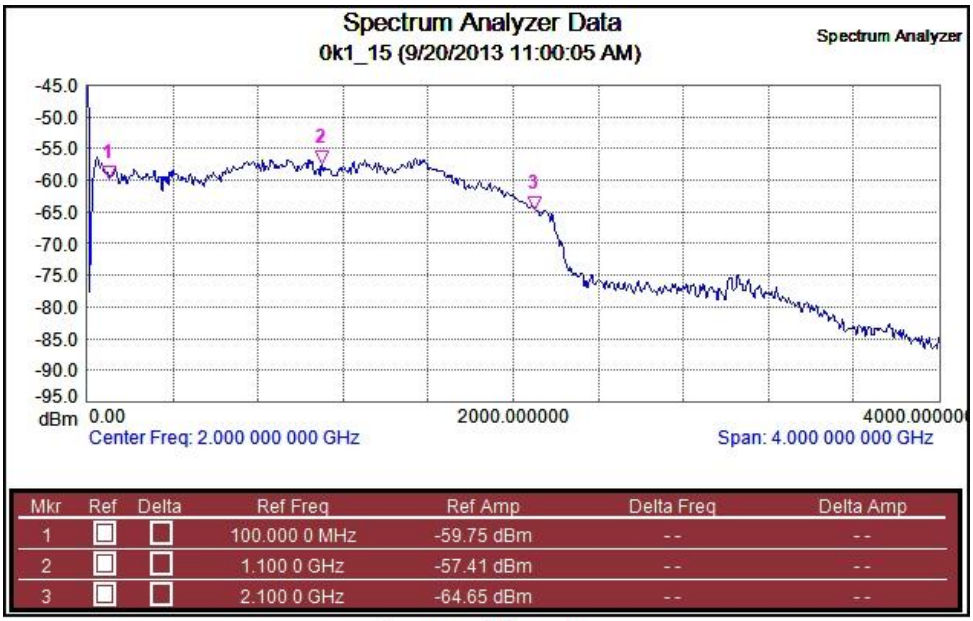
Fig. 6 20-22GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:11:17 AM
Start Frequency	0.000 000 Hz	Device Name	

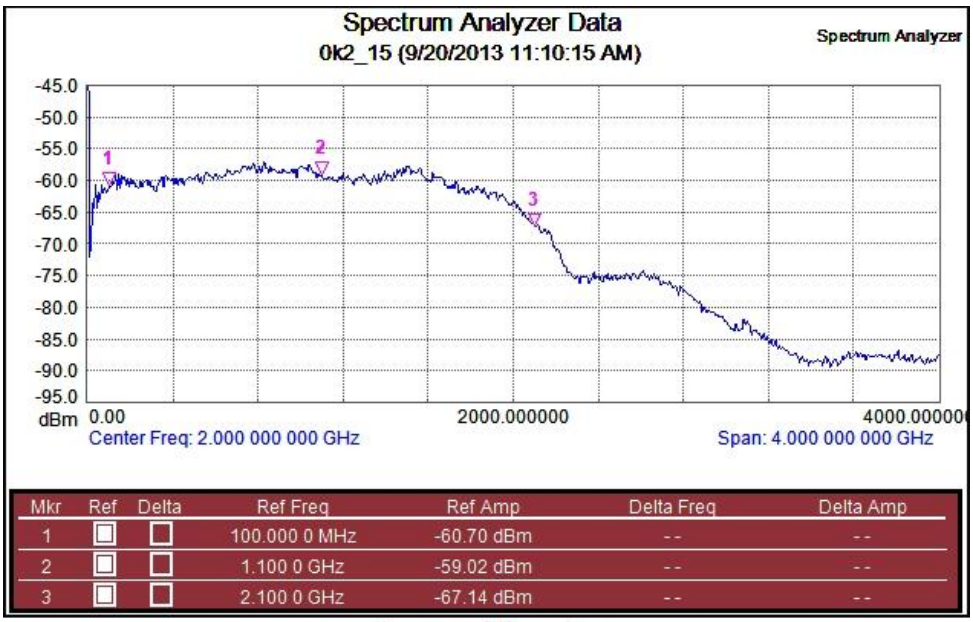
Fig. 7 20-22GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:00:05 AM
Start Frequency	0.000 000 Hz	Device Name	

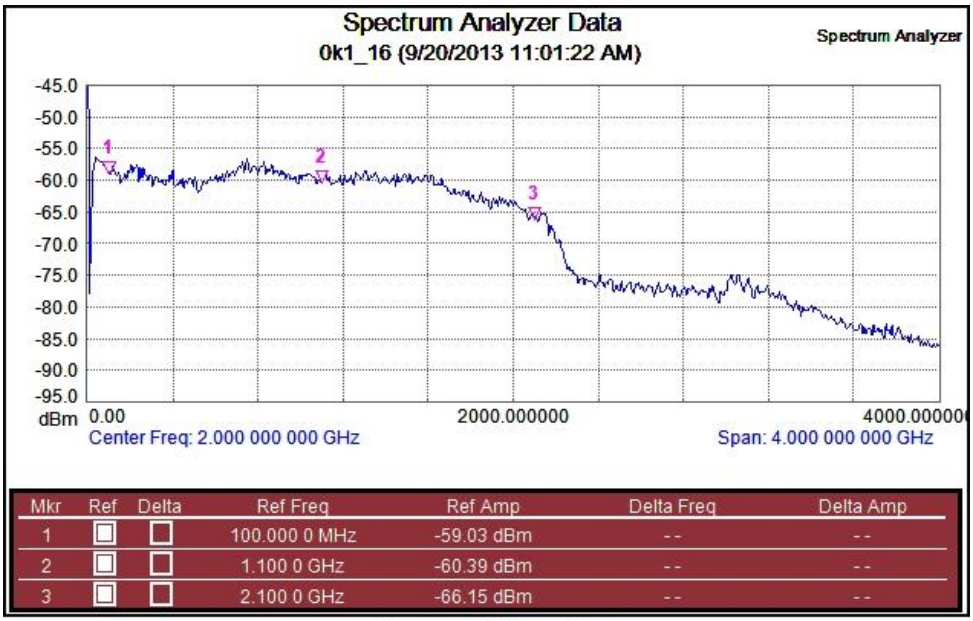
Fig. 8 21-23GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:10:15 AM
Start Frequency	0.000 000 Hz	Device Name	

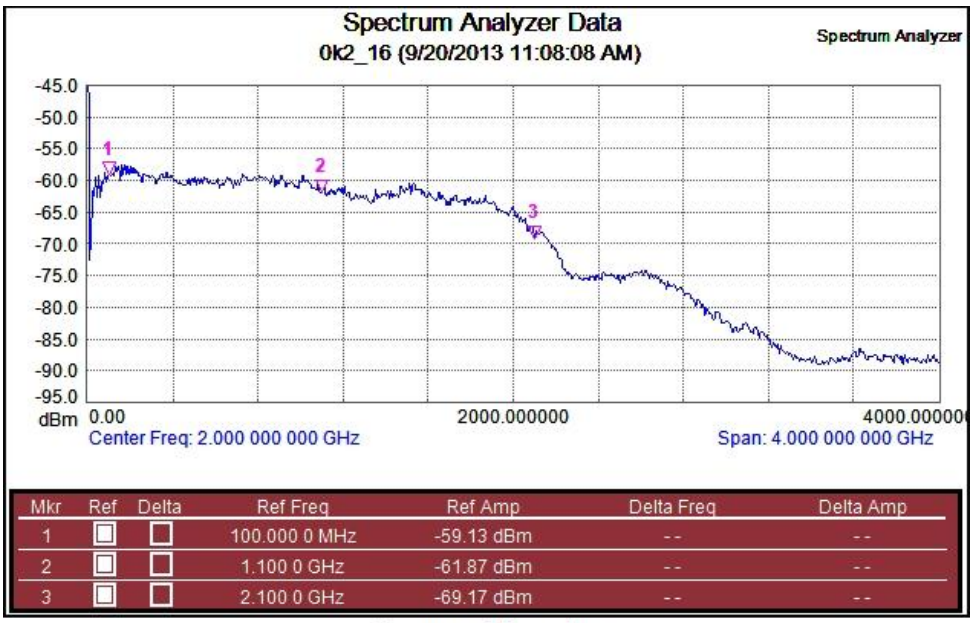
Fig. 9 21-23GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:01:22 AM
Start Frequency	0.000 000 Hz	Device Name	

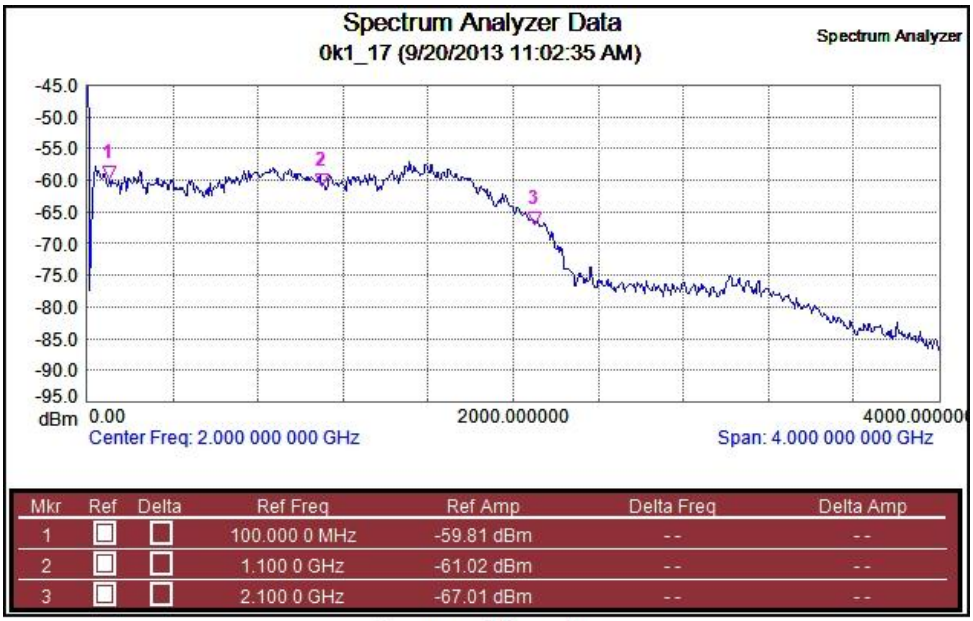
Fig. 10 22-24GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:08:08 AM
Start Frequency	0.000 000 Hz	Device Name	

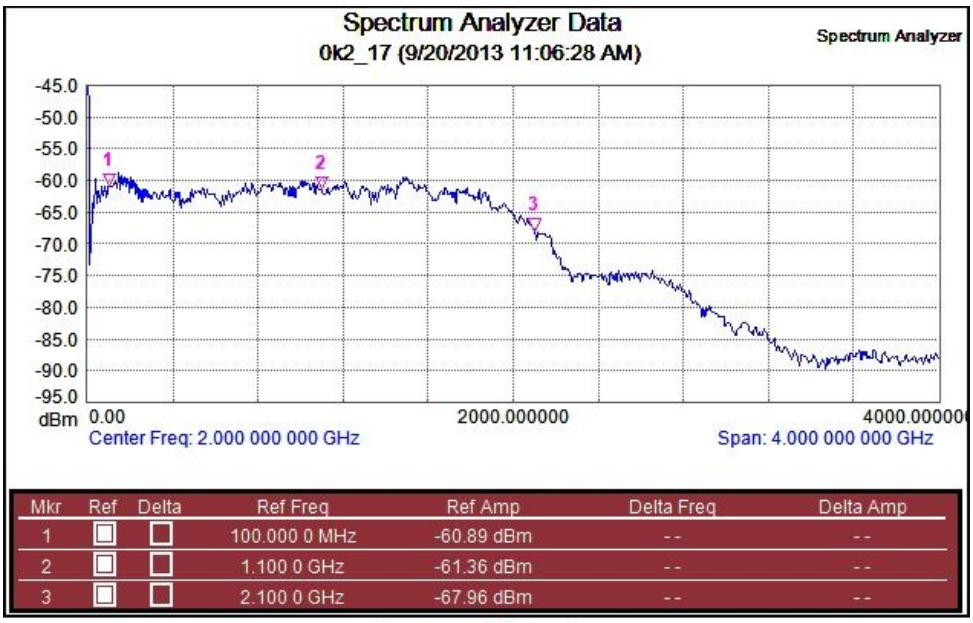
Fig. 11 22-24GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:02:35 AM
Start Frequency	0.000 000 Hz	Device Name	

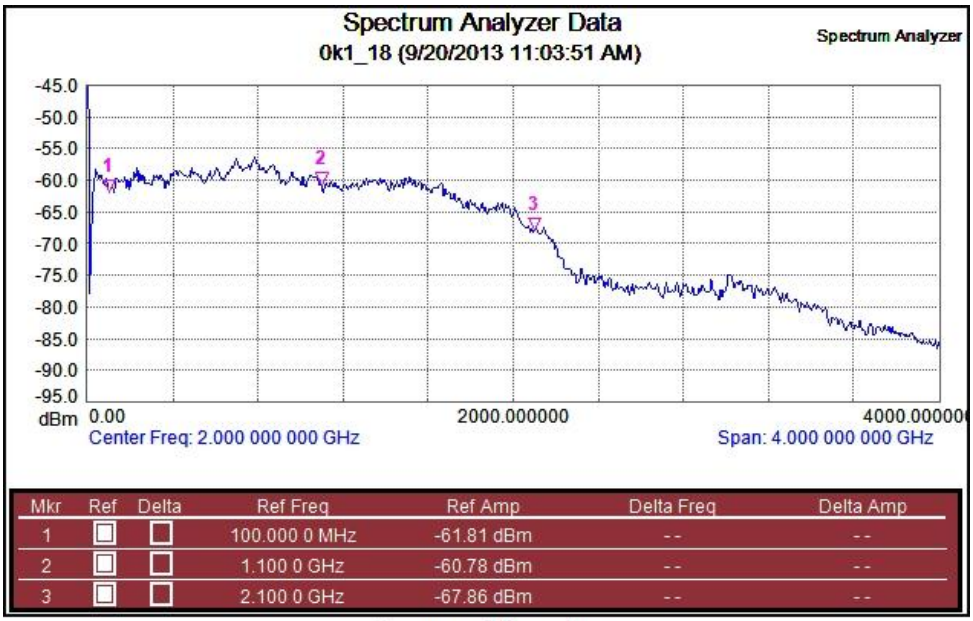
Fig. 12 23-25GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:06:28 AM
Start Frequency	0.000 000 Hz	Device Name	

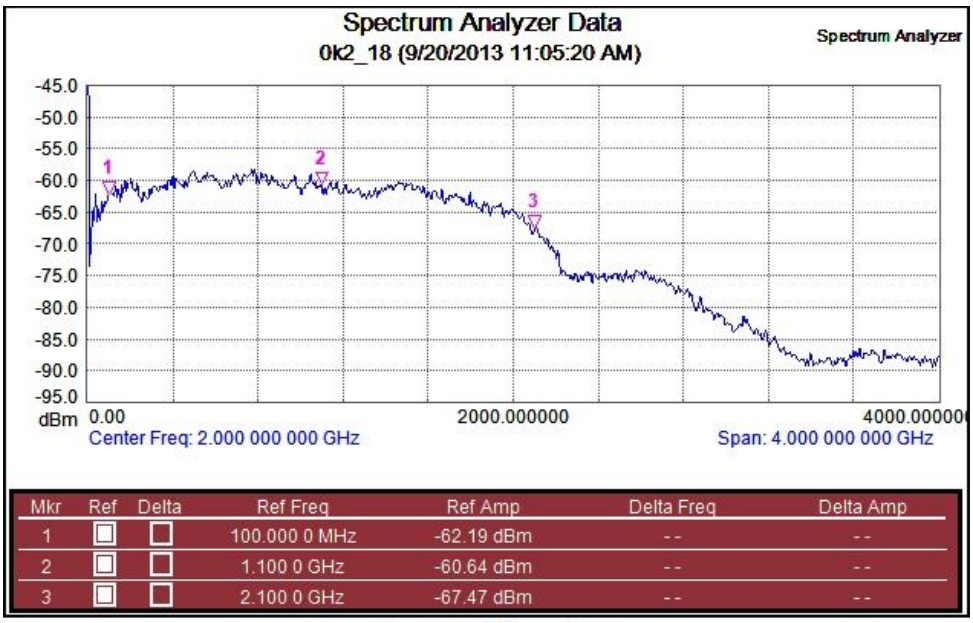
Fig. 13 23-25GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:03:51 AM
Start Frequency	0.000 000 Hz	Device Name	

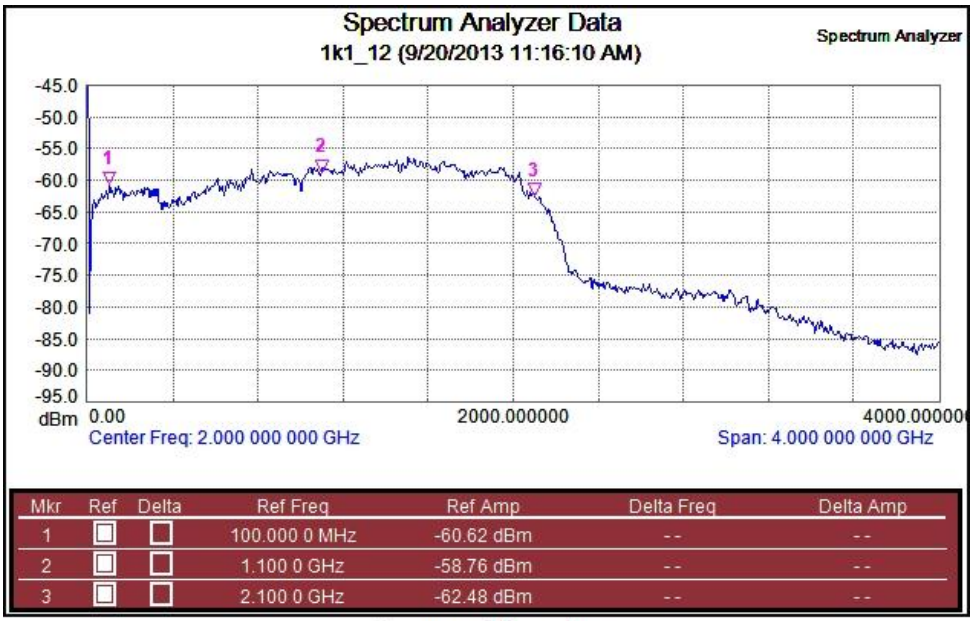
Fig. 14 24-26GHz; IF1-LCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:05:20 AM
Start Frequency	0.000 000 Hz	Device Name	

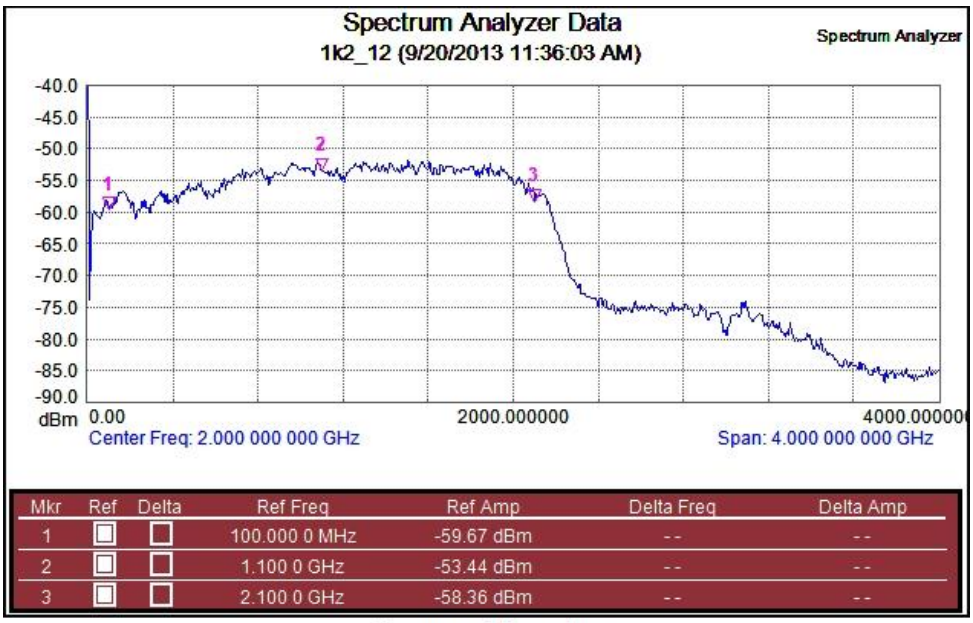
Fig. 15 24-26GHz; IF2-RCP; Horn0



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:16:10 AM
Start Frequency	0.000 000 Hz	Device Name	

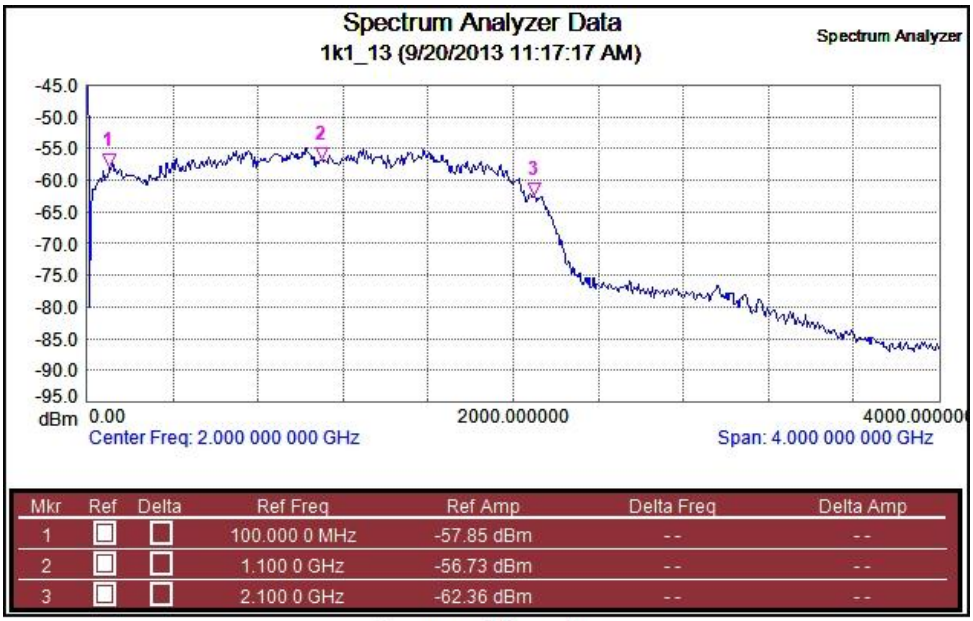
Fig. 16 18-20GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-40.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:36:03 AM
Start Frequency	0.000 000 Hz	Device Name	

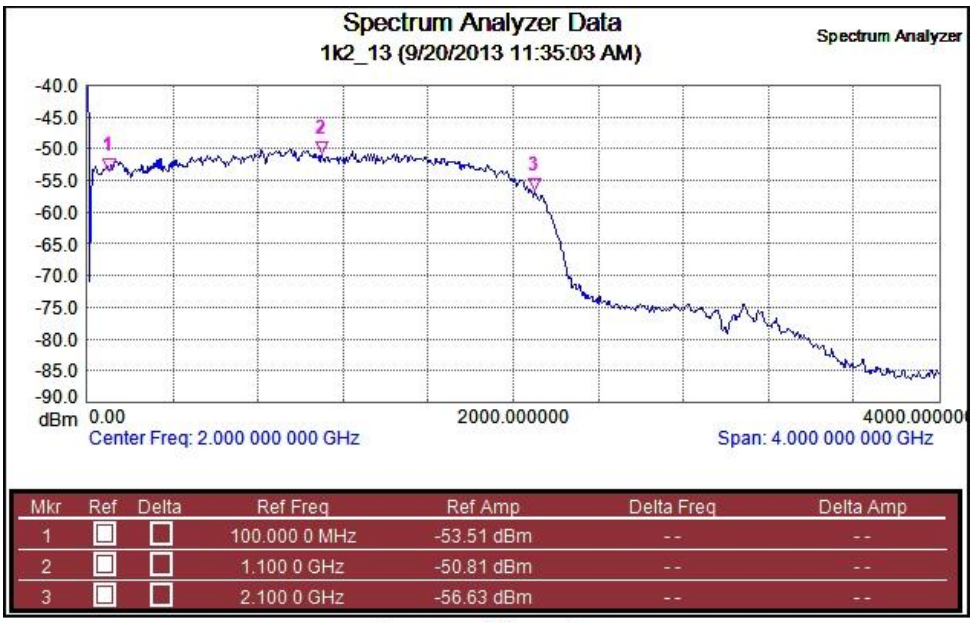
Fig. 17 18-20GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:17:17 AM
Start Frequency	0.000 000 Hz	Device Name	

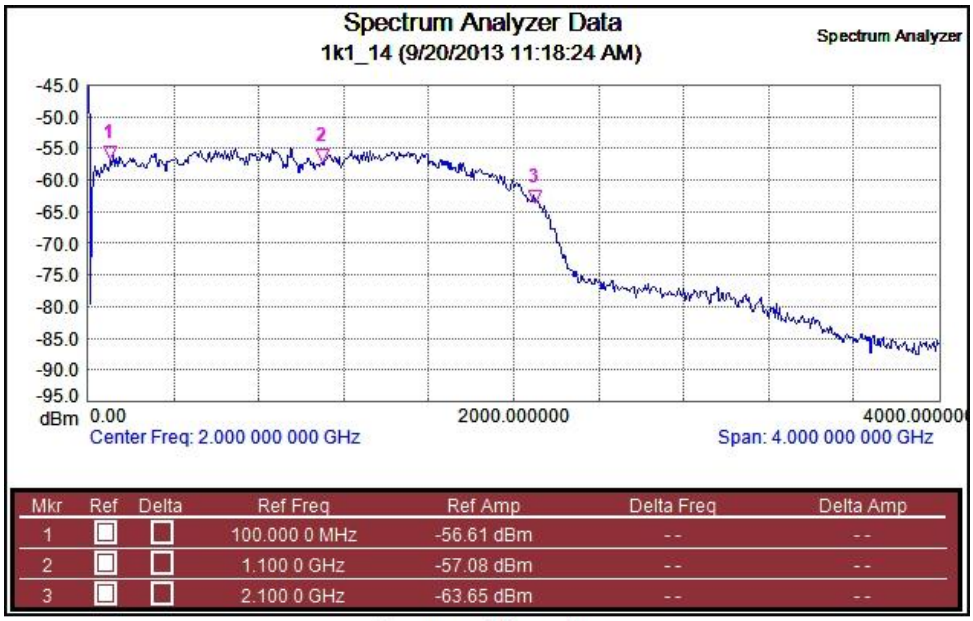
Fig. 18 19-21GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-40.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:35:03 AM
Start Frequency	0.000 000 Hz	Device Name	

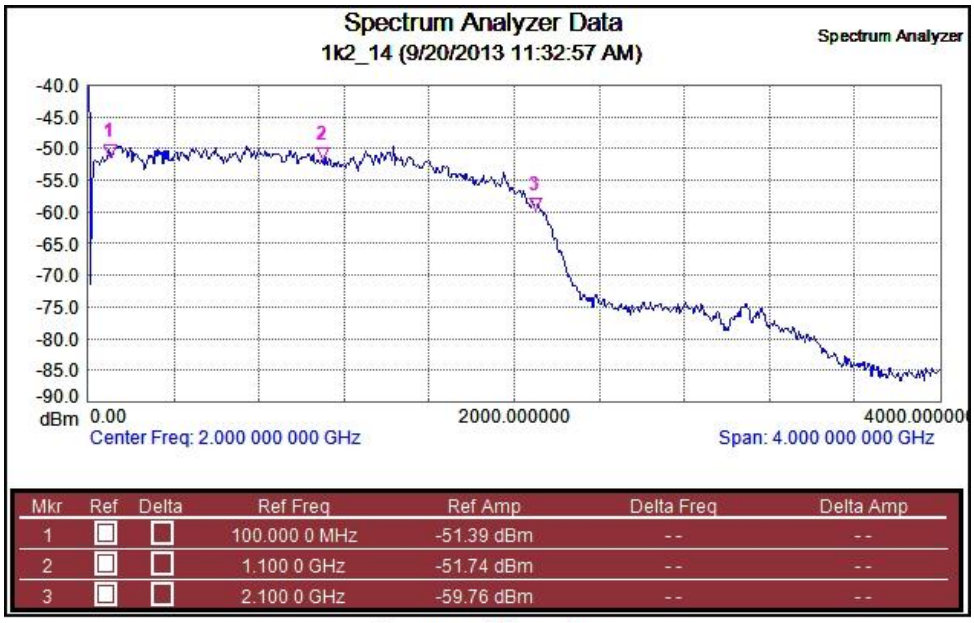
Fig. 19 19-21GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:18:24 AM
Start Frequency	0.000 000 Hz	Device Name	

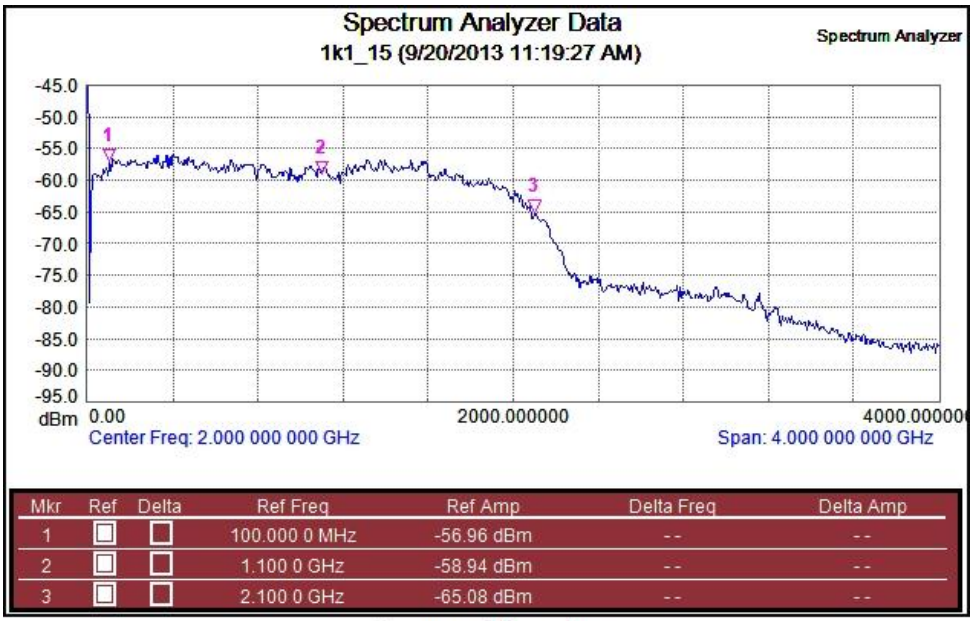
Fig. 20 20-22GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-40.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:32:57 AM
Start Frequency	0.000 000 Hz	Device Name	

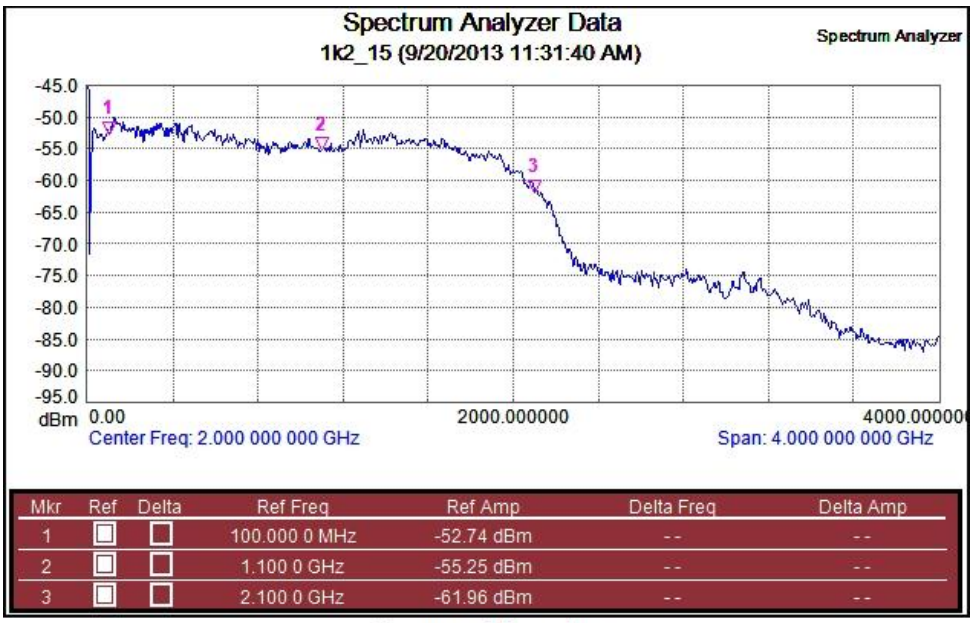
Fig. 21 20-22GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:19:27 AM
Start Frequency	0.000 000 Hz	Device Name	

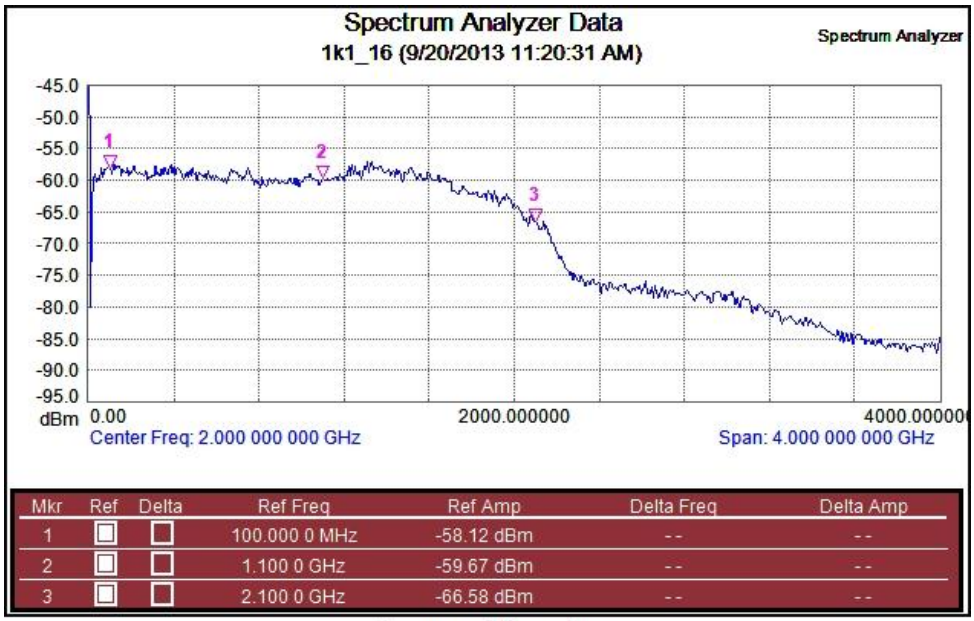
Fig. 22 21-23GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:31:40 AM
Start Frequency	0.000 000 Hz	Device Name	

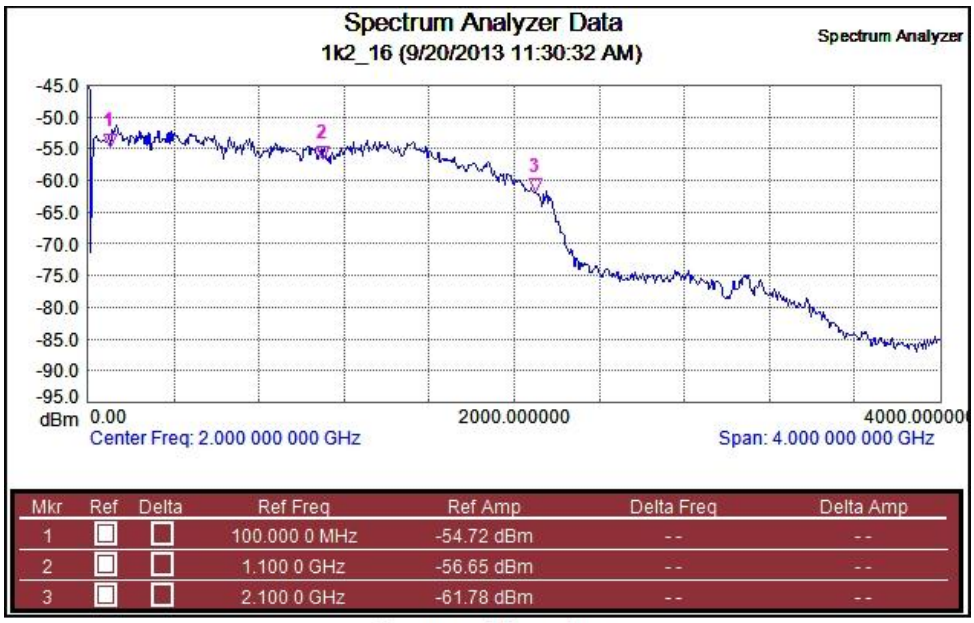
Fig. 23 21-23GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:20:31 AM
Start Frequency	0.000 000 Hz	Device Name	

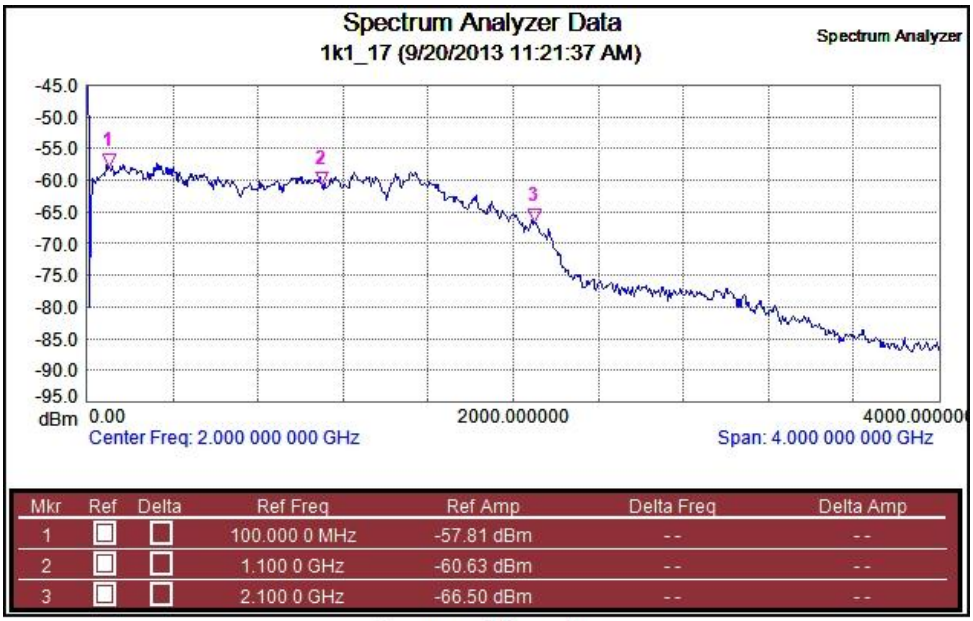
Fig. 24 22-24GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:30:32 AM
Start Frequency	0.000 000 Hz	Device Name	

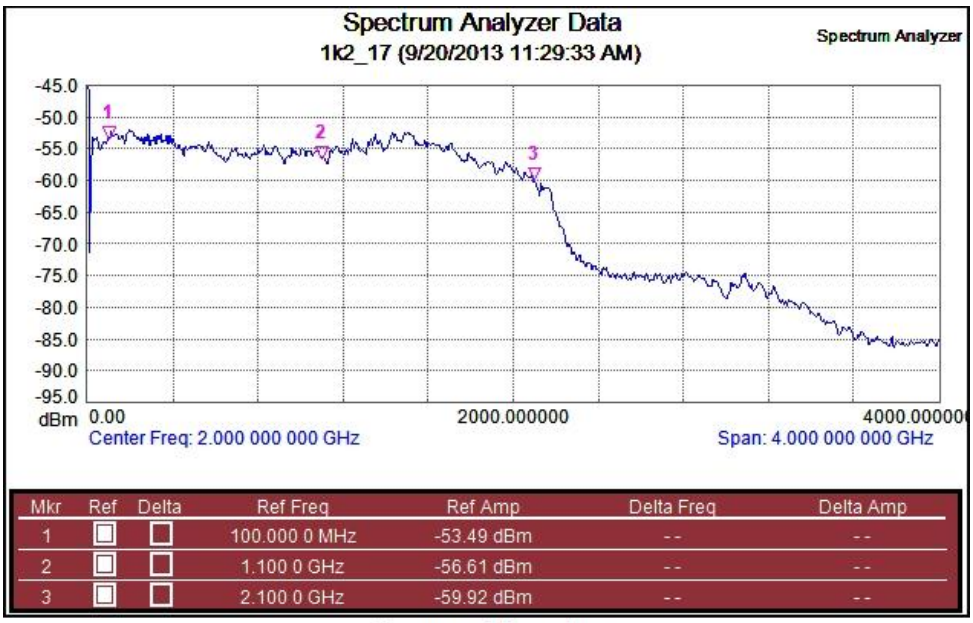
Fig. 25 22-24GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:21:37 AM
Start Frequency	0.000 000 Hz	Device Name	

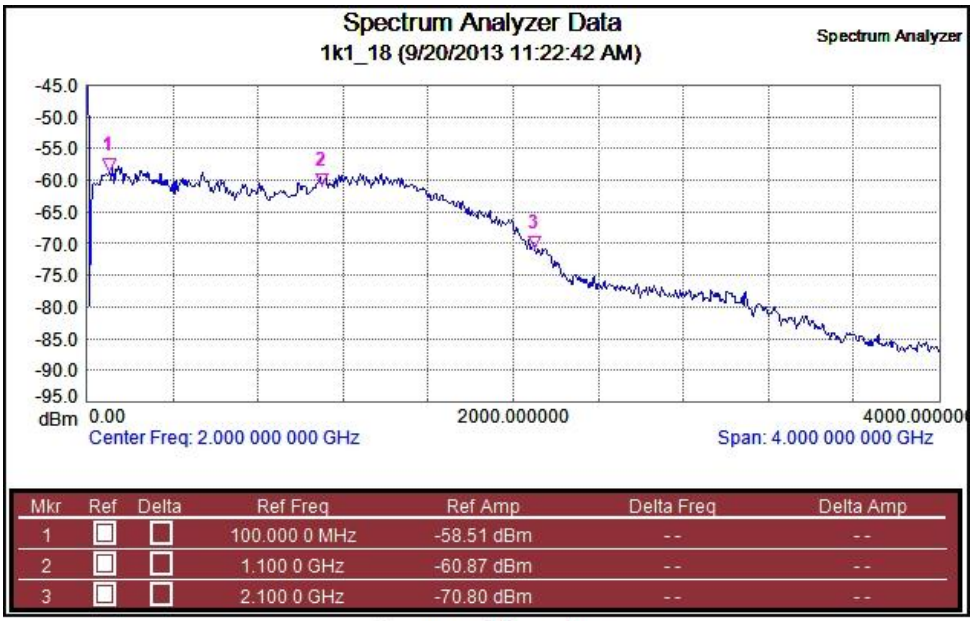
Fig. 26 23-25GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:29:33 AM
Start Frequency	0.000 000 Hz	Device Name	

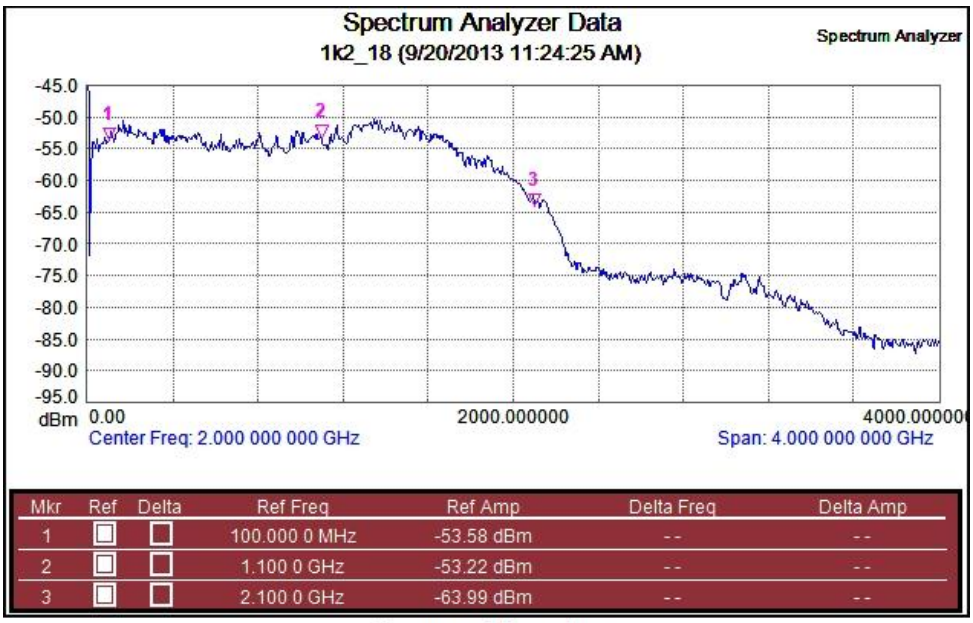
Fig. 27 23-25GHz; IF2-RCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:22:42 AM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 28 24-26GHz; IF1-LCP; Horn1



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	4.000 000 000 GHz
Trace Mode	Average	Frequency Span	4.000 000 000 GHz
Preamp	OFF	Reference Level	-45.000 dBm
Min Sweep Time	0.104 S	Scale	5.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	0.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	2.000 000 000 GHz	Date	9/20/2013 11:24:25 AM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 29 24-26GHz; IF2-RCP; Horn1

CONSIDERAZIONI SUGLI ANDAMENTI IN BANDA K

1) Tutte le sottobande del horn 0 stanno intorno al livello di -60dBm. Quelle dell'horn 1 sono più variabili e sono comprese tra -50 e -60dBm.

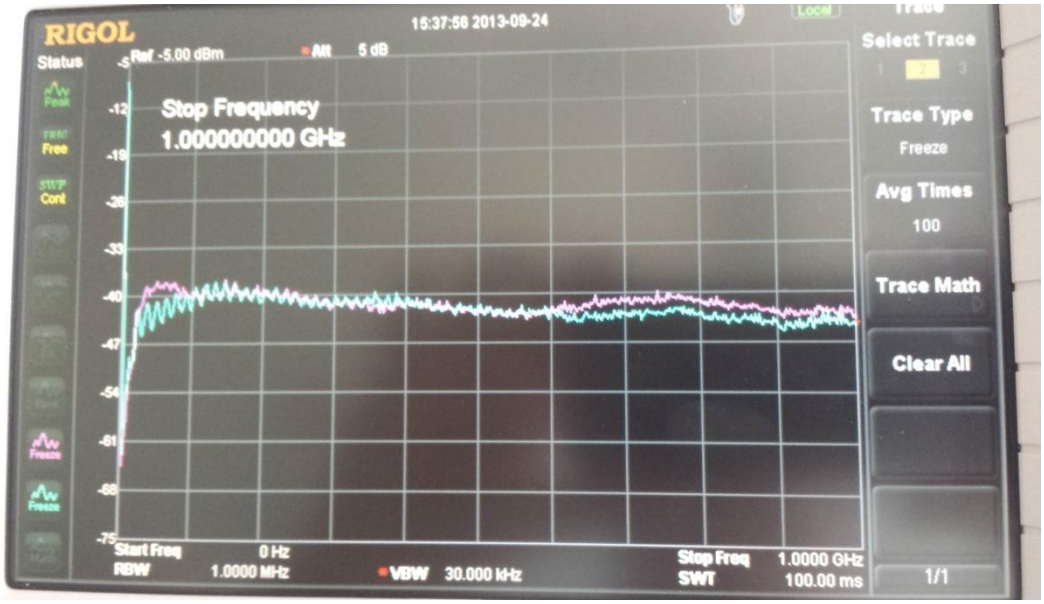
2) Guardando alle varie sottobande in genere la flatness in banda (intesa come valore massimo – valore minimo dell'ampiezza) per l'horn 0 è sui 5-6dB, per l'horn 1 può raggiungere anche i 10dB.

3) In entrambi i casi è dovuta al fatto che la frequenza a 2.1 GHz viene tagliata ben più dei -3dB.

4) Fuori banda si nota una netta risalita a partire da circa 2.35GHz per l'horn0 e circa 2.4GHz per l'horn1. Da lì la banda rimane piatta fino a 3.2 GHz per l'horn0 LCP, 2.6 GHz per l'horn0 RCP e circa 3 GHz uguale per entrambe le polarizzazioni per l'horn1.

5) L'horn0 LCP sottobanda 18-20 GHz mostra una stranissima pendenza tra 500 e 800 MHz.

6) Successivamente, sull'horn0 RCP sottobanda 22-24 GHz, è stato visto un ripple nella parte iniziale della banda, tra 0 e 200 MHz, non visibile nelle acquisizioni di questo rapporto per la non sufficiente risoluzione in frequenza (span di 4GHz con 550 punti). In figura il grafico con l'analizzatore di spettro in dotazione alla sala controllo. Questo aspetto sarà da verificare: il responsabile candidato è un non buon funzionamento dello switch coassiale nell'IF distributor in Vertex Room o i cavi blu di IF della Andrew da noi intestati,

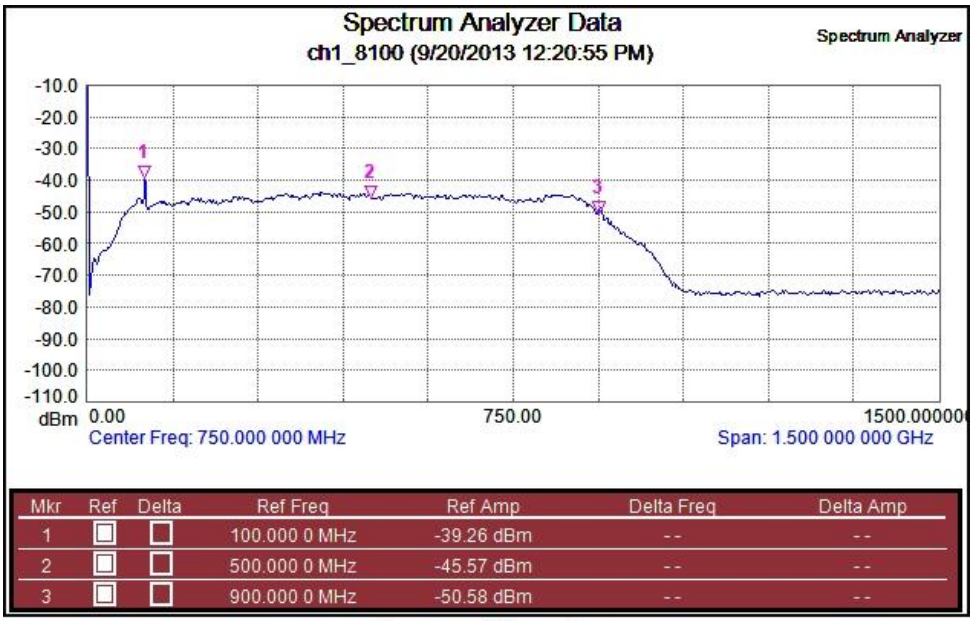


7) A futura memoria si riporta la mappa degli LNA usati nelle quattro catene riceventi,

RICEVITORE	TIPO LNA
0K1-LCP	NRAO KM022
0K2-RCP	HOMEMADE IN GUIDA, sostituisce il NRAO KM023
1K1-LCP	NRAO KM026
1K2-RCP	NRAO KM027

Tab.3

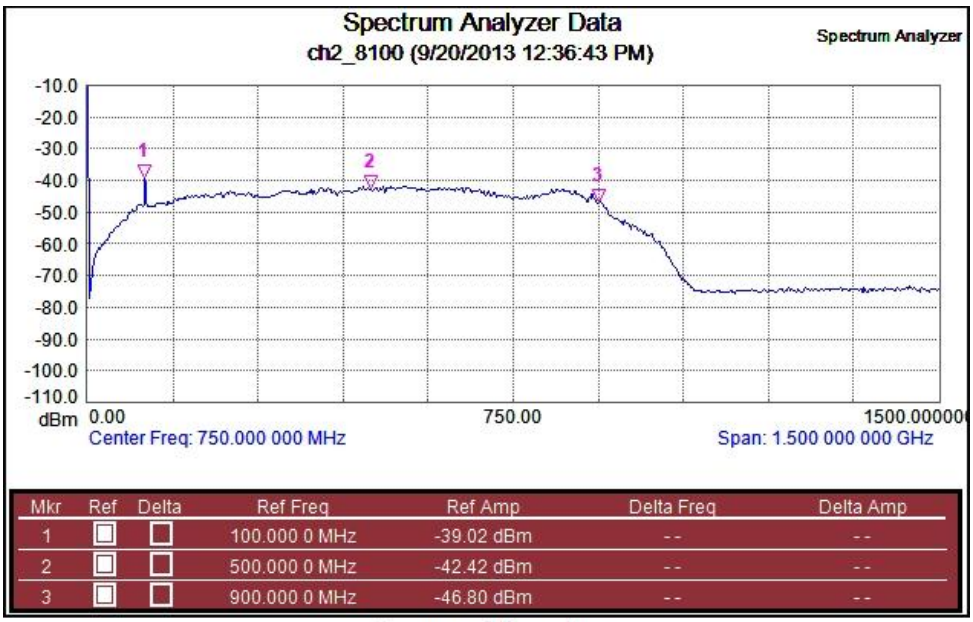
RICEVITORE SINGOLO FEED 7 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:20:55 PM
Start Frequency	0.000 000 Hz	Device Name	

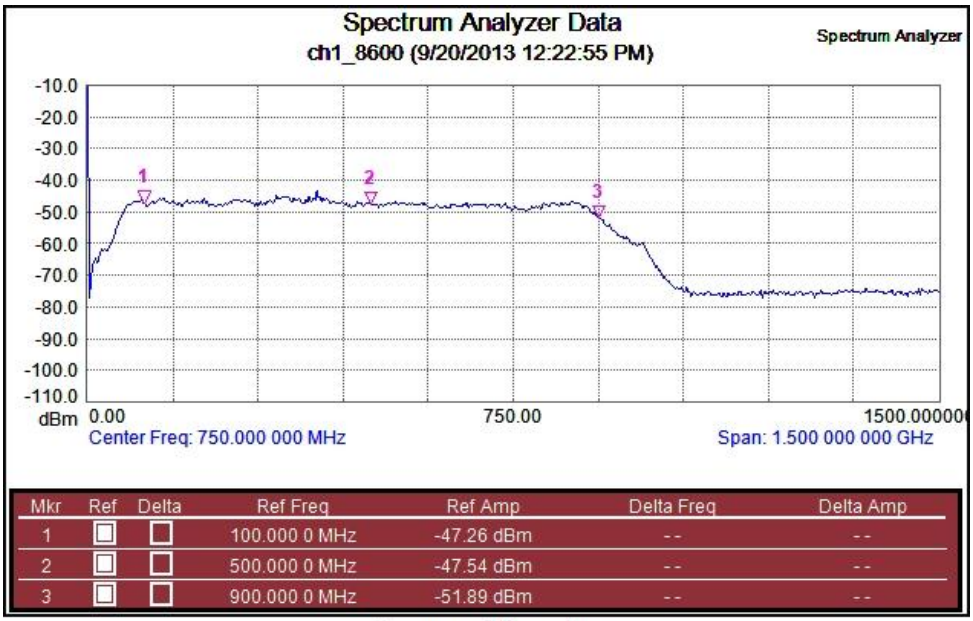
Fig. 30 5.9-6.7GHz; IF1-LCP



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:36:43 PM
Start Frequency	0.000 000 Hz	Device Name	

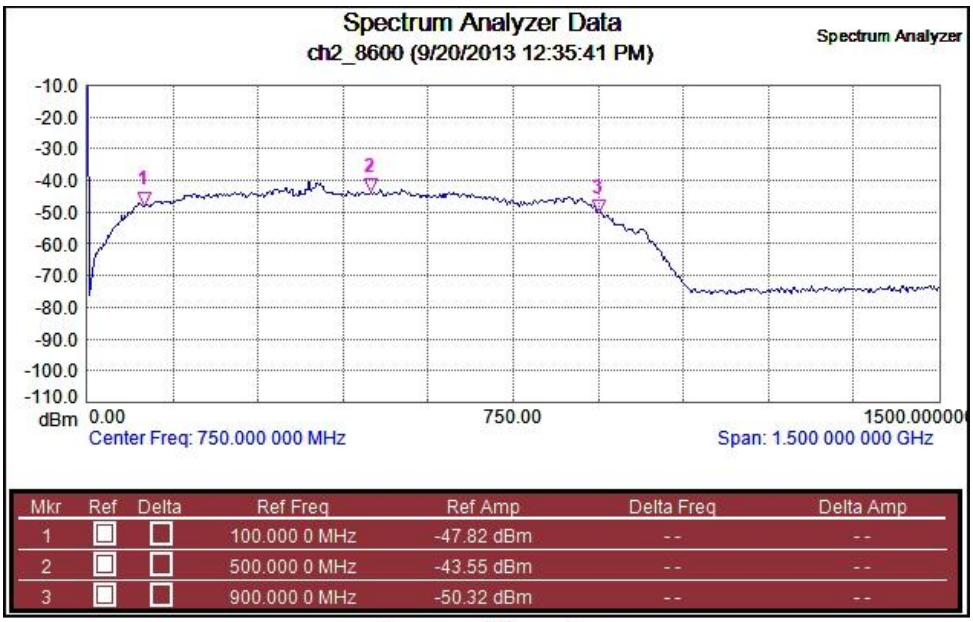
Fig. 31 5.9-6.7GHz; IF2-RCP



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:22:55 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 32 6.4-7.2GHz; IF1-LCP

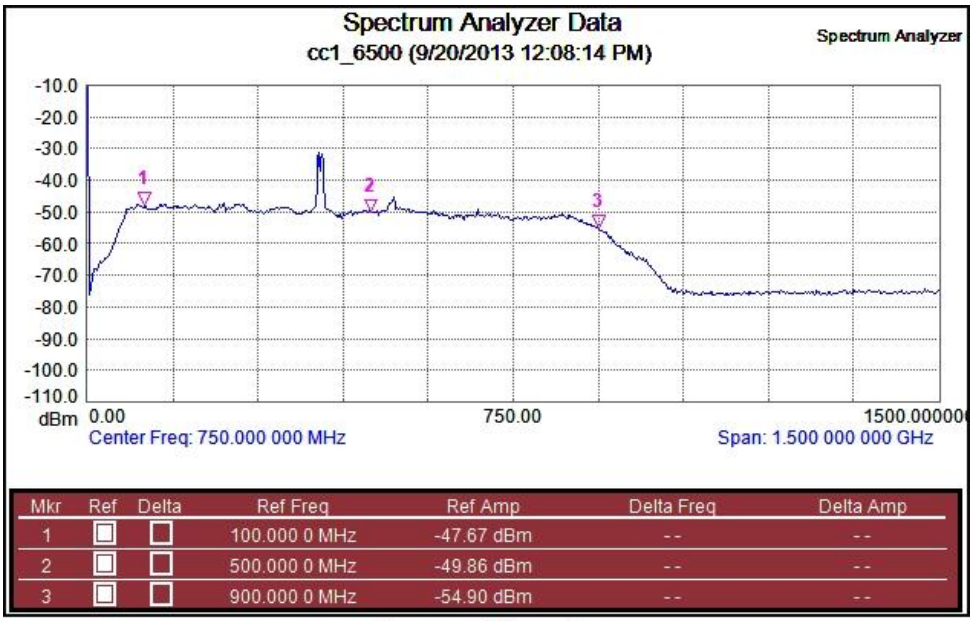


Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:35:41 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 33 6.4-7.2GHz; IF2-RCP

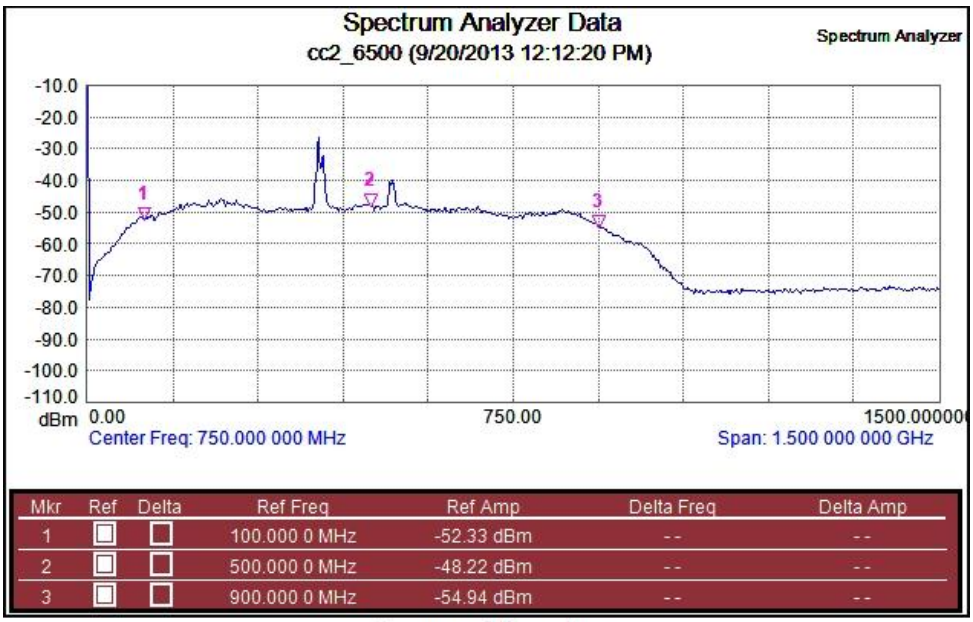
RICEVITORE SINGOLO FEED 5 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:08:14 PM
Start Frequency	0.000 000 Hz	Device Name	

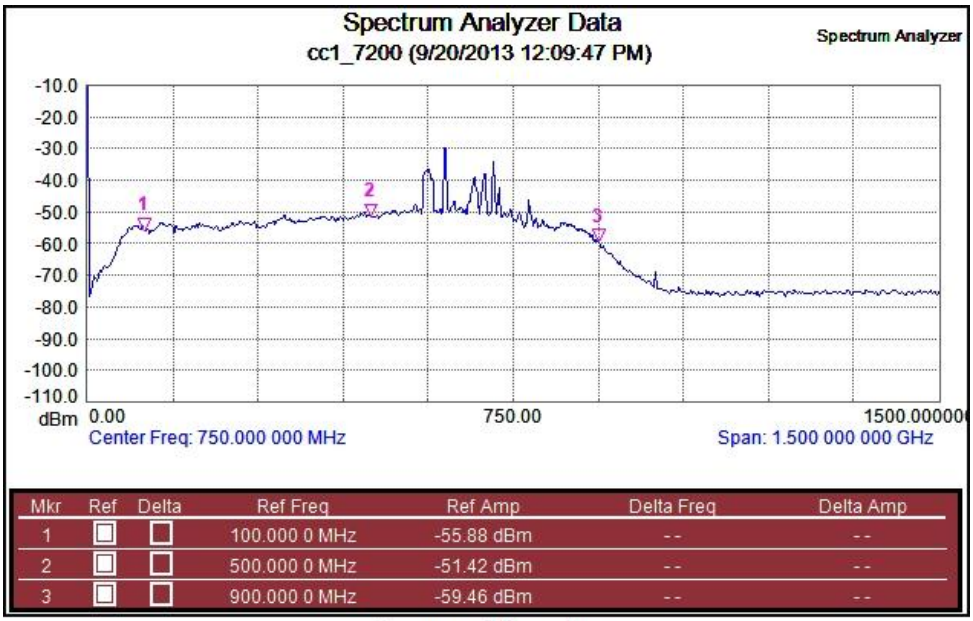
Fig. 34 4.3-5.1GHz; IF1-LCP



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:12:20 PM
Start Frequency	0.000 000 Hz	Device Name	

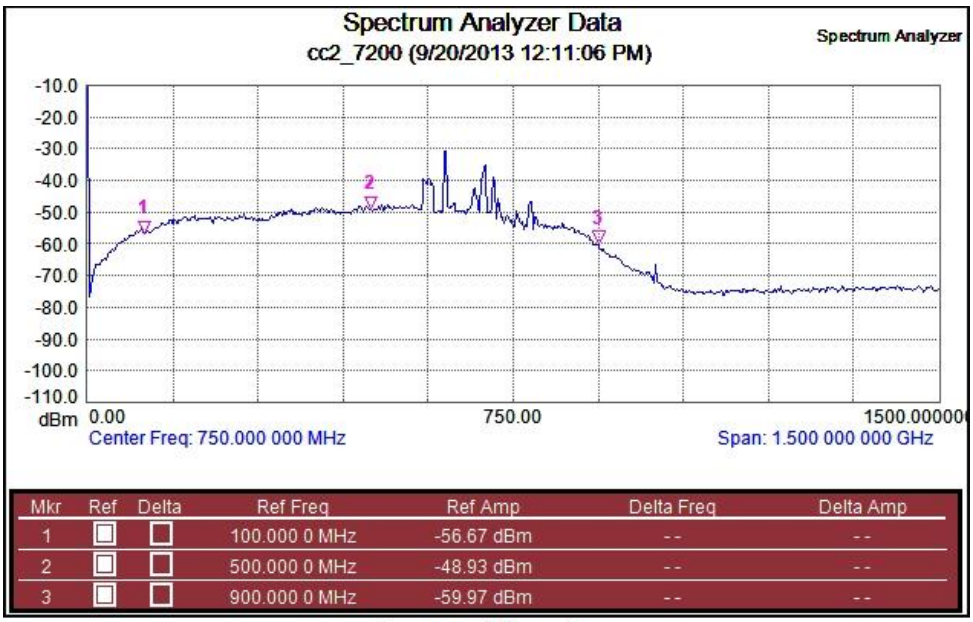
Fig. 35 4.3-5.1GHz; IF2-RCP



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:09:47 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 36 5.0-5.8GHz; IF1-LCP

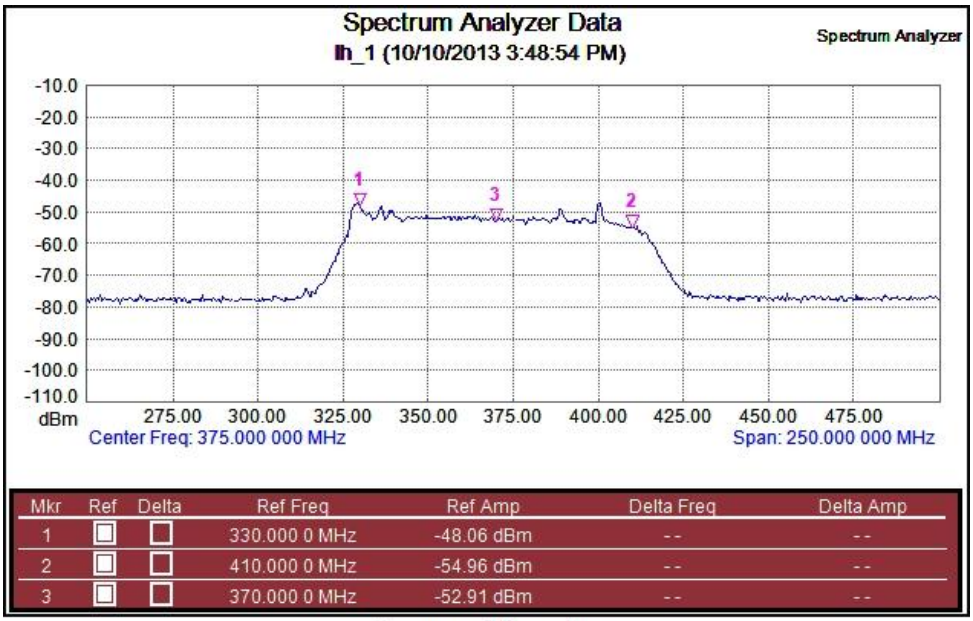


Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	9/20/2013 12:11:06 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 37 5.0-5.8GHz; IF2-RCP

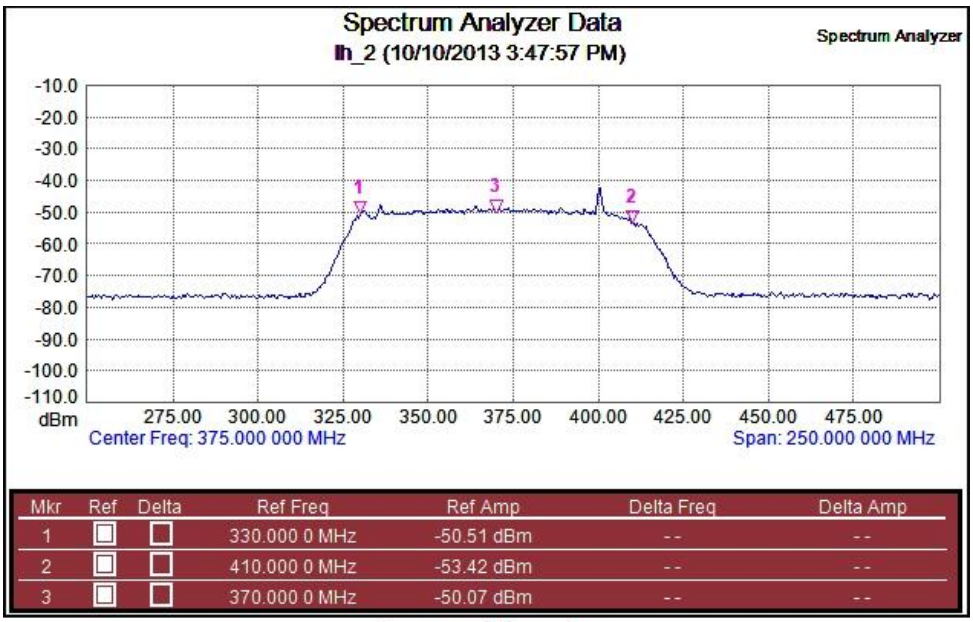
RICEVITORE SINGOLO FEED 1.4 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.000 000 MHz
Trace Mode	Average	Frequency Span	250.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	375.000 000 MHz	Date	10/10/2013 3:48:54 PM
Start Frequency	250.000 000 MHz	Device Name	

Fig. 38 1.35-1.45GHz; IF1-LCP

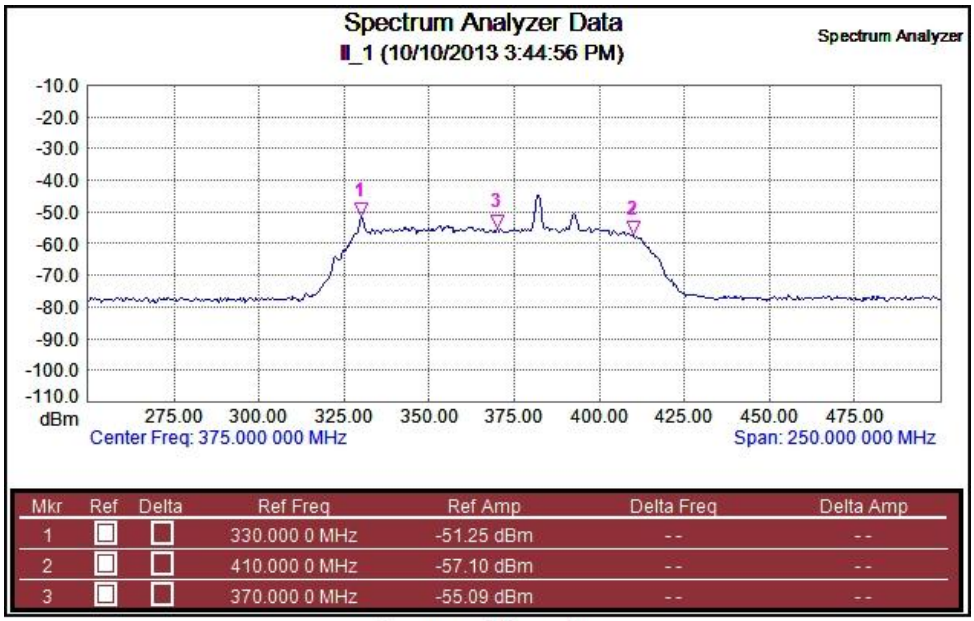


Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.000 000 MHz
Trace Mode	Average	Frequency Span	250.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	375.000 000 MHz	Date	10/10/2013 3:47:57 PM
Start Frequency	250.000 000 MHz	Device Name	

Fig. 39 1.35-1.45GHz; IF2-RCP

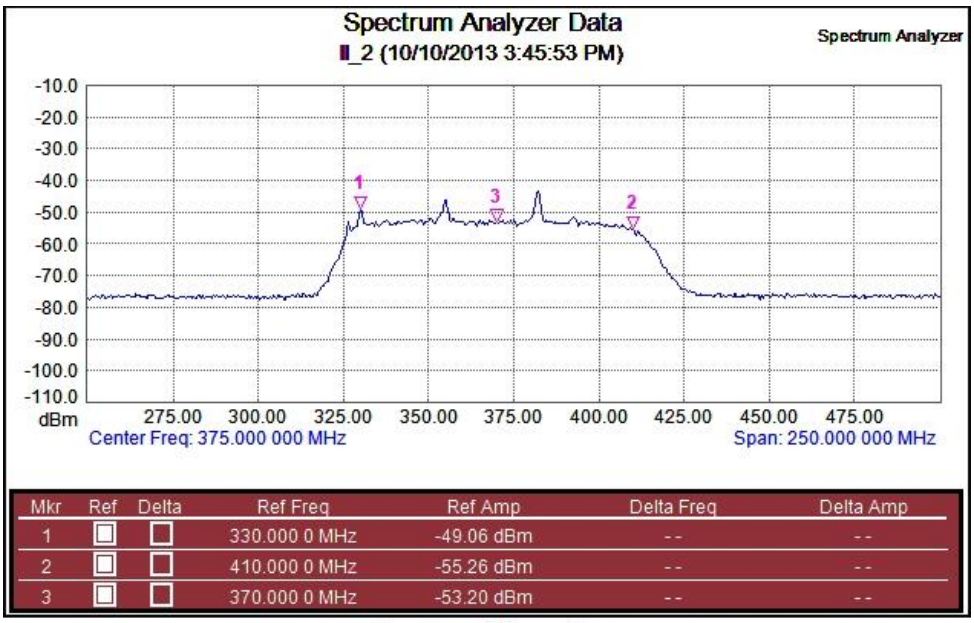
RICEVITORE SINGOLO FEED 1.6 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.000 000 MHz
Trace Mode	Average	Frequency Span	250.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	375.000 000 MHz	Date	10/10/2013 3:44:56 PM
Start Frequency	250.000 000 MHz	Device Name	

Fig. 40 1.6-1.7GHz; IF1-LCP

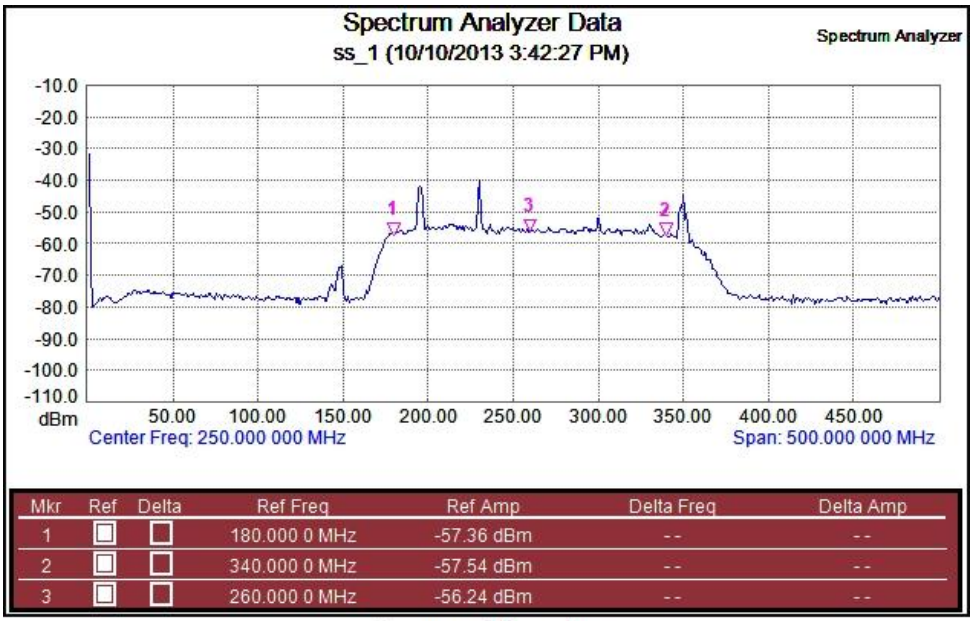


Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.000 000 MHz
Trace Mode	Average	Frequency Span	250.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	375.000 000 MHz	Date	10/10/2013 3:45:53 PM
Start Frequency	250.000 000 MHz	Device Name	

Fig. 41 1.6-1.7GHz; IF2-RCP

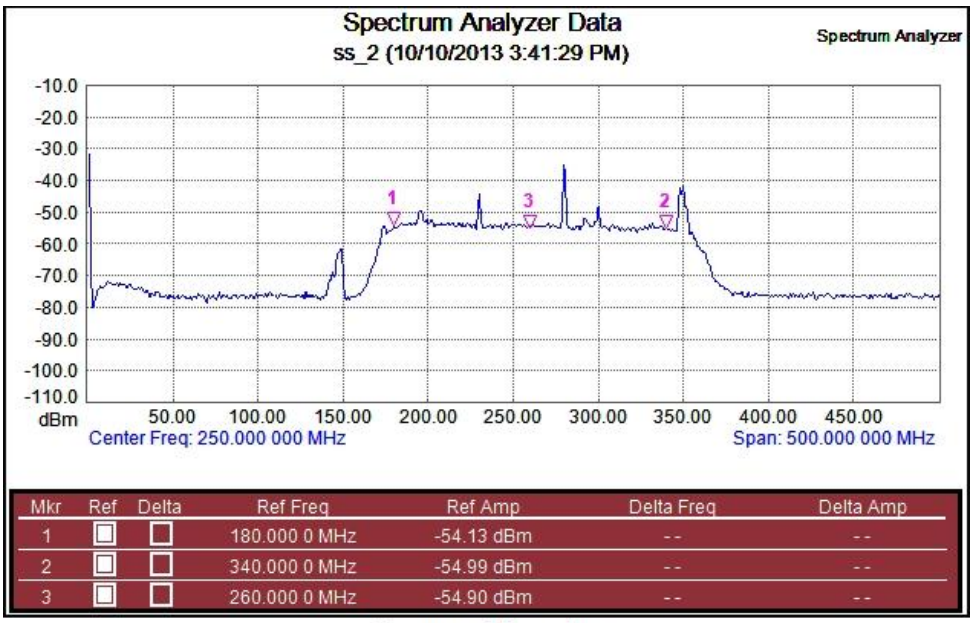
RICEVITORE SINGOLO FEED 2 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.909 091 MHz
Trace Mode	Average	Frequency Span	500.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	250.909 091 MHz	Date	10/10/2013 3:42:27 PM
Start Frequency	909.091 000 kHz	Device Name	

Fig. 42 2.20-2.36GHz; IF1-LCP

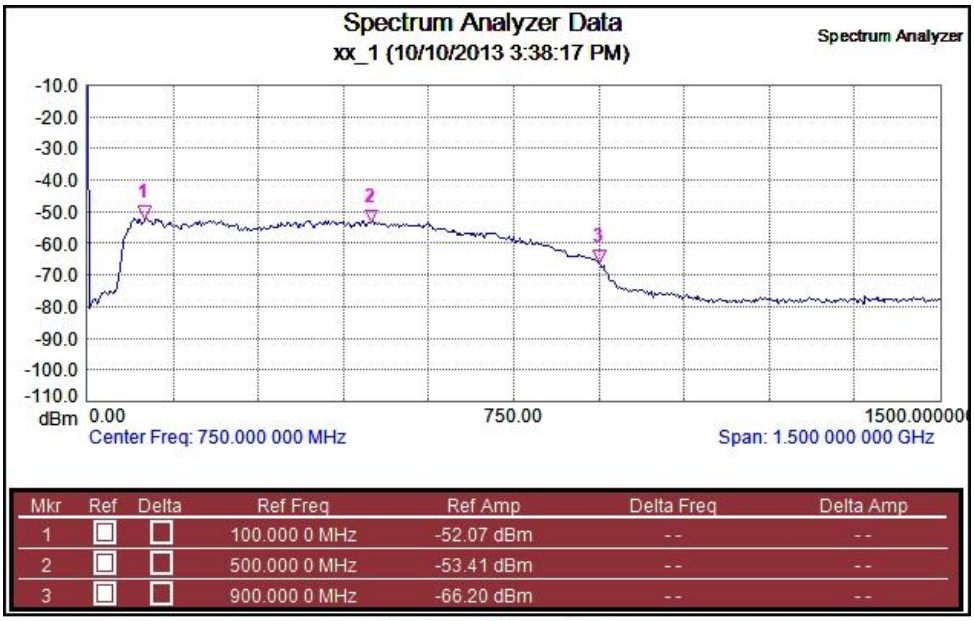


Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	500.909 091 MHz
Trace Mode	Average	Frequency Span	500.000 000 MHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	250.909 091 MHz	Date	10/10/2013 3:41:29 PM
Start Frequency	909.091 000 kHz	Device Name	

Fig. 43 2.20-2.36GHz; IF2-RCP

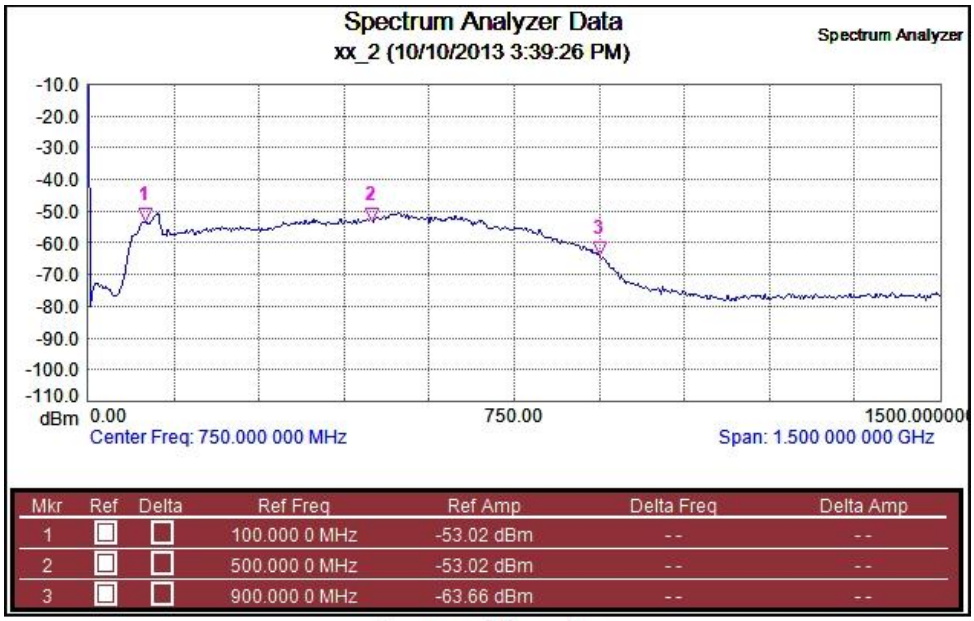
RICEVITORE SINGOLO FEED 8 GHz



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	10/10/2013 3:38:17 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 44 8.18-8.98GHz; IF1-LCP



Measurement Parameters

Trace A data:Trace Average	64	Stop Frequency	1.500 000 000 GHz
Trace Mode	Average	Frequency Span	1.500 000 000 GHz
Preamp	OFF	Reference Level	-10.000 dBm
Min Sweep Time	0.104 S	Scale	10.0 dB/div
Reference Level Offset	0 dB	Serial Number	1313031
Input Attenuation	10.0 dB	Base Ver.	V4.34
RBW	1.0 MHz	App Ver.	V5.72
VBW	1.0 MHz	Model	MS2726C
Detection	Sample	Options	
Center Frequency	750.000 000 MHz	Date	10/10/2013 3:39:26 PM
Start Frequency	0.000 000 Hz	Device Name	

Fig. 45 8.18-8.98GHz; IF2-RCP

RIFERIMENTI

1. F. Perini “SRT optical links prototypes characterization”, IRA 444/11