

No. I18Z60510-WMD01 Page 172 of 212

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	• +	Frequency	v 🔆
KEYSIGHT Input: RF Coupling: D Align: Auto/	C Corrections: Off Prear	: 6 dB PNO: Fast np: Off Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) 1 2 3 4 5 6 Avg Hold: 4/100 A WW WW W A N	15.00000000 GHz	ttings
1 Spectrum Scale/Div 10 dB Log		Offset 46.39 dB /el 16.39 dBm	Mkr1 18.79 GHz -44.566 dBm		
6.39				Full Span Start Freq	
-13.6			DL1 -19.02 dBm	10.00000000 GHz Stop Freq	
-33.6			â1	20.00000000 GHz	
-43.6	······			CF Step 1.000000000 GHz	
-63.6				Man Freq Offset 0 Hz	
Start 10.000 GHz #Res BW 1.0 MHz	#Vide	o BW 3.0 MHz*	Stop 20.000 GH: #Sweep ~20.2 s (1001 pts		
	Jun 11, 2019 💬 🖊 12:38:47 PM			Signal Track (Span Zoom)	



Configuration NB-IoT-StandAlone-1C, QPSK

Channel Bandwidth	RBW (MHz)	Limit (dBm)
250 KHz	1.0	-13.0

Port B , Channel Position B

Spectrum Analyzer 1 Swept SA	Swept SA		Spectrum Ar Swept SA	nalyzer 3	+		Frequency	▼ ∺
KEYSIGHT Inpu	pling: DC Corre	ctions: Off Prea Ref: Int (S)	amp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) Avg Hold: 5/100 Trig: Free Run	1 2 3 4 5 6 A WW WW W A N N N N N	Center Frequency 1.500004500 GHz Span	Settings
1 Spectrum Scale/Div 10 dB Log	T		l Offset 40.98 evel 40.98 dBn				2.99999100 GHz	
31.0							Zero Span Full Span	
21.0							Start Freq 9.000 kHz	
0.980							Stop Freq 3.000000000 GHz	
-9.02						DL1 -13.00 dBm	AUTO TUNE CF Step	
-29.0				······			299.999100 MHz Auto Man	
-49.0							Freq Offset 0 Hz	
Start 9 kHz #Res BW 1.0 MHz			eo BW 3.0 MH	Z*	Sto #Sweep ~6.01	p 3.000 GHz s (6000 pts)	X Axis Scale Log Lin	
1 7 C	Jun 8:01	11, 2019 7:28 AM					Signal Track (Span Zoom)	

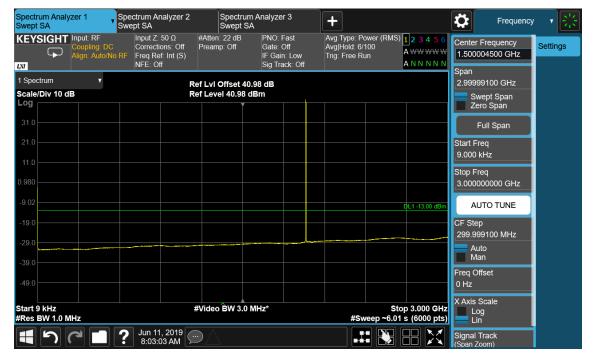




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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum A Swept SA	nalyzer 3	+	Frequency	、影
KEYSIGHT Input: RF Coupling: DC Align: Auto/N	Corrections: Off	Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) 1 2 3 4 5 6 Avg Hold: 3/100 A WW WW W A N		Settings
1 Spectrum Scale/Div 10 dB Log		f LvI Offset 46.39 f Level 16.39 dBr		Mkr1 18.78 GHz -45.807 dBm	10.0000000 GHz Swept Span	
6.39					Zero Span Full Span	
-3.61				DL1 -13.00 dBn		
-23.6					Stop Freq 20.00000000 GHz	
-43.6	M.c	·		<u> </u>	AUTO TUNE CF Step 1.000000000 GHz	
-53.6	······································				Auto Man	
-73.6					Freq Offset 0 Hz	
Start 10.000 GHz #Res BW 1.0 MHz		Video BW 3.0 MH	iz*	Stop 20.000 GH #Sweep ~20.2 s (1001 pts		
	Jun 11, 2019 8:09:20 AM				Signal Track (Span Zoom)	

Port B , Channel Position M





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Spectrum Analyz Swept SA		Spectrum Analyzer 2 Swept SA	Spectrum Swept SA	Analyzer 3	+	Frequency	- * 景
	nput: RF Coupling: DC Align: Auto/No F	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 6 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) 12 3 4 5 6 Avg Hold: 3/100 Trig: Free Run A N N N N N	Center Frequency 6.50000000 GHz	Settings
1 Spectrum Scale/Div 10 dB Log	•		ef LvI Offset 42. ef Level 17.00 d		Mkr1 3.924 GHz -36.508 dBm	1.000000000000	
7.00						Full Span Start Freq	
-13.0					DL1 -13.00 dBm	3.000000000 GHz Stop Freq 10.000000000 GHz	
-33.0	1					AUTO TUNE CF Step	
-53.0		~~~~~		\sim	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	700.000000 MHz Auto Man	
-73.0						Freq Offset 0 Hz X Axis Scale	
Start 3.000 GHz #Res BW 1.0 MH			∜Video BW 3.0 N	/Hz*	Stop 10.000 GHz #Sweep ~14.1 s (1001 pts)	Log	
1 5(? Jun 11, 2019 8:06:28 AM				Signal Track (Span Zoom)	





Port B , Channel Position T







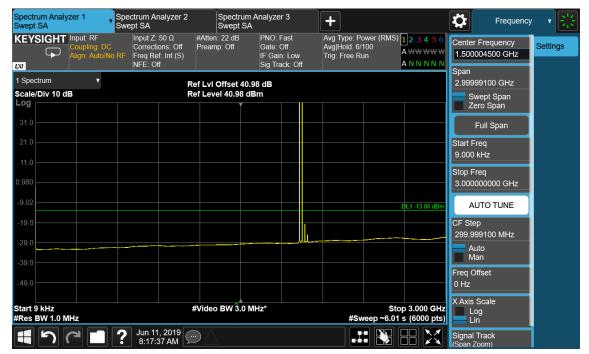
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Spectrum Analyze Swept SA	Sw	ectrum Analyzer 2 /ept SA	Spectrum. Swept SA		• +		Frequency	[茶
	nput: RF coupling: DC lign: Auto/No RF	Corrections: Off	Atten: 6 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Powe Avg Hold: 3/100 Trig: Free Run	r (RMS) <mark>1</mark> 2 3 4 5 6 A W W W W A N N N N N	Center Frequency 15.000000000 GHz Span	Settings
1 Spectrum Scale/Div 10 dB	•		ef LvI Offset 46.3 ef Level 16.39 dE		MI	(r1 18.79 GHz -46.060 dBm	10.0000000 GHz Swept Span Zero Span	
6.39							Full Span	
-13.6						DL1 -13.00 dBm	Start Freq 10.000000000 GHz Stop Freq	
-23.6							20.00000000 GHz	
-43.6	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					CF Step 1.00000000 GHz	
-63.6							Auto Man Freq Offset	
-73.6 Start 10.000 GHz		#	Video BW 3.0 M	IHz*		Stop 20.000 GHz	0 Hz X Axis Scale Log	
#Res BW 1.0 MH		Jun 11, 2019 8:13:17 AM			#Swee	p ~20.2 s (1001 pts)	Signal Track (Span Zoom)	

Configuration NB-IoT-StandAlone-2C, QPSK

Channel Bandwidth	RBW (MHz)	Limit (dBm)
250 KHz	1.0	-13.0

Port B , Channel Position B





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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyz Swept SA	ter 3		Frequency	- * ※
KEYSIGHT Input: RF Coupling: DO Align: Auto/N	Corrections: Off	Preamp: Off Gate	: Fast Avg Type: : Off Avg Hold: ain: Low Trig: Free rack: Off		Center Frequency 6.500000000 GHz Span	Settings
1 Spectrum v Scale/Div 10 dB		f LvI Offset 42.00 dB f Level 17.00 dBm		Mkr1 3.882 GHz -41.543 dBm	7.00000000 GHz Swept Span Zero Span	
-3.00					Full Span	
-13.0				DL1 -13.00 dBm	Start Freq 3.000000000 GHz Stop Freq	
-23.0					10.000000000 GHz	
-43.0					CF Step 700.000000 MHz	
-63.0					Auto Man Freq Offset	
-73.0	#	Video BW 3.0 MHz*		Stop 10.000 GHz	0 Hz X Axis Scale	
#Res BW 1.0 MHz	" Jun 11, 2019 8:16:56 AM			Sweep ~14.1 s (1001 pts)	Log Lin Signal Track (Span Zoom)	





Port B , Channel Position M







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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	+	Frequency	v 💥
KEYSIGHT Input: RF Coupling: DC Align: Auto/N	Corrections: Off Pre	en: 6 dB PNO: Fast eamp: Off Gate: Off IF Gain: Lov Sig Track: C		15.00000000 GHz	ettings
1 Spectrum Scale/Div 10 dB Log		vl Offset 46.39 dB evel 16.39 dBm	Mkr1 18.79 GH -45.819 dBn	10.000000000112	
6.39 -3.61				Full Span	
-13.6			DL1 -13.00 dBr	Start Freq 10.000000000 GHz Stop Freq	
-23.6				20.000000000 GHz	
-43.6				CF Step 1.000000000 GHz	
-53.6				Auto Man Freq Offset	
-73.6				0 Hz X Axis Scale	
Start 10.000 GHz #Res BW 1.0 MHz	#Vic ? Jun 11, 2019	deo BW 3.0 MHz*	Stop 20.000 GH #Sweep ~20.2 s (1001 pts		

Port B , Channel Position T



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Spectrue	m Analyzer 3	Spectrum Analyzer 4 Swept SA	Spectrum A Swept SA		pectrum Analyzer 6 wept SA	+	Marker	▼ <mark>\$*</mark>
	HT Input: RF Coupling: DC Align: Auto/No F	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 6 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) Avg Hold: 5/100 Trig: Free Run	123456 AWWWWW ANNNNN	Select Marker Marker 1	
1 Spectrum Scale/Div 1	T I0 dB	R	ef LvI Offset 42.0 ef Level 5.32 dBn	0 dB		.358 GHz .827 dBm	Marker Frequency 4.358000000 GHz	Settings Peak
Log							Peak Search	Search
-4.68						DL1 -13.00 dBm	Next Peak	Pk Search Config
-14.7							Next Pk Right	Properties
-24.7							Next Pk Left	Marker Function
-44.7							Minimum Peak	Marker→
-54.7		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		\sim			Pk-Pk Search	Counter
-64.7							Marker Delta	
-74.7							Mkr→CF	
-84.7							Mkr→Ref Lvl	
Start 3.000 #Res BW 1			∜Video BW 3.0 MI	Hz*	Sto #Sweep ~14.1	o 10.000 GHz s (1001 pts)	On	
1		? Jun 05, 2019 4:04:55 PM					Off	





Configuration WCDMA+LTE-MIMO-MC-1 (1WCDMA 64QAM +1LTE QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
W: 5.0 MHz	1.0	-19.02	
L: 5.0 MHz	1.0	-19.02	
W: 5.0 MHz	1.0	-19.02	
L: 10.0 MHz	1.0		
W: 5.0 MHz	1.0	-19.02	
L: 15.0 MHz	1.0	-19.02	
W: 5.0 MHz	1.0	-19.02	
L: 20.0 MHz	1.0	-19.02	

Port B , Channel Position M, LTE 5.0 MHz





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Spectrum Analyzer Swept SA	1 Spectrum Ar Swept SA	nalyzer 2 Spectrun Swept Sk	n Analyzer 3 A	+	Frequency	· ↓ 器
	It: RF Input Z: pling: DC Correction n: Auto/No RF Freq Re NFE: Ad	ons: Off Preamp: Off f: Int (S)	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) 1 2 3 4 5 6 Avg Hold: 3/100 A WW WW W Trig: Free Run A N N N N N	Center Frequency 6.500000000 GHz	Settings
1 Spectrum Scale/Div 10 dB Log	•	Ref LvI Offset 42 Ref Level 16.00 c		Mkr1 3.987 GHz -35.568 dBm	Span 7.00000000 GHz Swept Span Zero Span	
6.00					Full Span Start Freq	
-14.0				DL1 -19.02 dBm	3.000000000 GHz Stop Freq 10.000000000 GHz	
-34.0					AUTO TUNE CF Step	
-54.0			\sim		700.000000 MHz Auto Man	
-74.0					Freq Offset 0 Hz X Axis Scale	
Start 3.000 GHz #Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 10.000 GHz #Sweep ~14.1 s (1001 pts)	Log Lin	
1 1	Jun 11 1:10:4				Signal Track (Span Zoom)	





Port B , Channel Position M, LTE 10.0 MHz







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KEYSIGHT Input RF Corrections: Off Align Autority RF Input Z: 50 0 Corrections: Off Free Ref: Int(S) NFE: Adaptive Atten: 6 dB Preamp: Off PNO Fast Gate: Off Avg Type: Power (RMS) Tig: Free Run 2 2 3 4 5 6 Avg/Hoid 3/100 Center Frequency Is.00000000 GHz Settings 1 Spectrum Ref Lvl Offset 46.39 dB Ref Level 16.39 dBm MKr1 18.79 GHz 43.962 dBm Span 10.0000000 GHz Span 10.0000000 GHz Span 2 Zero Span South Span 2 Zero Span Statt Freq 10.00000000 GHz Statt Freq 10.0000000 GHz Statt Freq 10.00000000 GHz 23.6 0	Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer Swept SA		Frequency v
1 Spectrum Ref Lvi Offset 46.39 dB Mkr1 18.79 GHz 10.000000 GHz Scale/Div 10 dB Ref Level 16.39 dB -43.962 dBm Swept Span 6.39 -43.962 dBm Full Span 3.61 -13.6 -14.4 -14.4 -23.6 -14.4 -14.4 -14.4 -23.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 -33.6 -14.4 -14.4 -14.4 <	Coupling: D Align: Auto/I	C Corrections: Off Pro No RF Freq Ref: Int (S)	eamp: Off Gate: Of IF Gain:	Low Trig: Free Run AW	W WW W 15.00000000 GHz
6.39	Scale/Div 10 dB				9 GHz 10.000000 GHz 2 dBm Swept Span
-13.6 0L1-19.02 dBm Stop Freq -23.6 -1 -1 -33.6 -1 -1 -43.6 -1 -1 -43.6 -1 -1 -53.6 -1 -1 -53.6 -1 -1 -63.6 -1 -1 -73.6 -1 -1 Stop Freq 20.0000000 GHz -41.0 -1 -43.6 -1 -43.6 -1 -53.6 -1 -63.6 -1 -73.6 -1 Stop Columbia -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.6 -1 -73.7					Full Span
-43.6				DL1	-19.02 dBm Stop Freq
-53.6 1.00000000 GHz -63.6 Auto -73.6 Huito -73.6 Huito Start 10.000 GHz #Video BW 3.0 MHz*				1	
-73.6 -73.6 Start 10.000 GHz #Video BW 3.0 MHz* Stop 20.000 GHz Log	-53.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			1.00000000 GHz
Start 10.000 GHz #Video BW 3.0 MHz* Stop 20.000 GHz Log					0 Hz
	Start 10.000 GHz #Res BW 1.0 MHz	Jun 11, 2019	deo BW 3.0 MHz*	#Sweep ~20.2 s (1	000 GHz 1001 pts)

Port B , Channel Position M, LTE 15.0 MHz





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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyze Swept SA			Frequency	▼ ²/₁
KEYSIGHT Input: RF Coupling: Align: Auto	DC Corrections: Off b/No RF Freq Ref: Int (S) NFE: Adaptive		Fast Avg Type: F Off Avg Hold: 3. n: Low Trig: Free R ack: Off		Center Frequency 6.500000000 GHz	Settings
1 Spectrum Scale/Div 10 dB Log		ef LvI Offset 42.00 dB ef Level 16.00 dBm		Mkr1 3.973 GHz -38.498 dBm	Span 7.00000000 GHz Swept Span Zero Span	
6.00					Full Span	
-14.0				DL1 -19.02 dBm	3.000000000 GHz Stop Freq	
-24.0 -34.0					10.000000000 GHz	
-44.0	Anna		Ann		CF Step 700.000000 MHz	
-64.0					Man Freq Offset 0 Hz	
Start 3.000 GHz #Res BW 1.0 MHz		¥Video BW 3.0 MHz*	#5	Stop 10.000 GHz weep ~14.1 s (1001 pts)	X Axis Scale Log Lin	
	Jun 11, 2019 1:20:14 PM				Signal Track (Span Zoom)	





Port B , Channel Position M, LTE 20.0 MHz







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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Spec Swept SA Swep	DI SA	+	Frequency	- * 亲
KEYSIGHT Input: RF Coupling: E Align: Auto	Input Z: 50 Ω Atten: 6 dB OC Corrections: Off Preamp: Off /No RF Freq Ref: Int (S) NFE: Adaptive	Gate: Off A	vg Type: Power (RMS) 1 2 3 4 5 6 vg Hold: 3/100 rig: Free Run A N N N N N	Center Frequency 15.000000000 GHz	Settings
1 Spectrum v Scale/Div 10 dB Log	Ref Lvi Offse Ref Level 16.	t 46.39 dB	Mkr1 18.80 GHz -44.105 dBm	Span 10.0000000 GHz Swept Span Zero Span	
6.39				Full Span	
-13.6			DL1 -19.02 dBm	10.000000000 GHz Stop Freq	
-33.6			<u>^1</u>	20.000000000 GHz	
-43.6				CF Step 1.000000000 GHz	
-63.6				Man Freq Offset 0 Hz	
Start 10.000 GHz #Res BW 1.0 MHz	#Video BW	3.0 MHz*	Stop 20.000 GHz #Sweep ~20.2 s (1001 pts)	X Axis Scale Log Lin	
	Jun 11, 2019 1:24:24 PM			Signal Track (Span Zoom)	



Configuration WCDMA+LTE-MIMO-MC-2 (2WCDMA 64QAM +1LTE QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
W: 5.0 MHz	10	-19.02	
L: 5.0 MHz	1.0	-19.02	

Port B , Channel Position M, LTE 5.0 MHz







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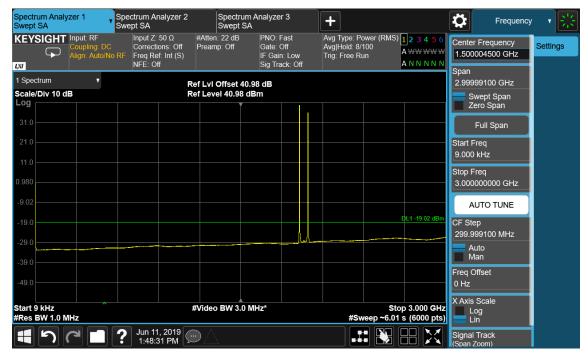
Spectrum Analyz Swept SA		Spectrum Ana Swept SA	alyzer 2	Spectr Swept	um Analyzer SA	· 3	+			\	Frequency	▼ <mark>\$'∕</mark>
	Input: RF Coupling: DC Align: Auto/No	Input Z: 5 Correction RF Freq Ref: NFE: Ada	ns: Off Int (S)	Atten: 6 dB Preamp: Off	PNO: F Gate: C IF Gain Sig Tra)ff ∷Low	Avg Type: P Avg Hold: 3/ Trig: Free R	/100 un	1 2 3 4 5 6 A WW WW W A N N N N N		requency 00000 GHz	Settings
1 Spectrum Scale/Div 10 dE	▼ 3			f LvI Offset 4 f Level 16.39					3.79 GHz 629 dBm	Swe	000 GHz pt Span Span	
6.39 -3.61										Start Fre	· .	
-13.6									DL1 -19.02 dBm	Stop Free	00000 GHz 7 00000 GHz	
-33.6				·	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				1	CF Step		
-53.6										Auto Man		
-73.6 Start 10.000 GH	z		#	Video BW 3.	0 MHz*			Stop	20.000 GHz	0 Hz X Axis So Log		
#Res BW 1.0 M		? Jun 11, 1:36:25	2019 5 PM				#S\		s (1001 pts)	Lin Signal Tr (Span Zoo		



Configuration WCDMA+NB-IoT-MC-1 (1WCDMA 64QAM+1SA QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
NB: 250 KHz	10	-19.02	
W: 5.0 MHz	1.0		

Port B , Channel Position M





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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyze Swept SA		‡	Frequency	- * ※
KEYSIGHT Input: RF Coupling: I Align: Auto			Fast Avg Type: Power (Off Avg Hold: 3/100 in: Low Trig: Free Run ack: Off		er Frequency 000000000 GHz	Settings
1 Spectrum v Scale/Div 10 dB Log		ef LvI Offset 46.39 dB ef Level 16.39 dBm		1 18.78 GHz 10.0 -44.621 dBm	' 0000000 GHz Swept Span Zero Span	
6.39					Full Span	
-13.6				DL1 -19.02 dBm Stop	000000000 GHz Freq 000000000 GHz	
-33.6						
-53.6					00000000 GHz Auto Man	
-73.6				0 Hz	Offset z is Scale	
Start 10.000 GHz #Res BW 1.0 MHz	Jun 11, 2019	¥Video BW 3.0 MHz*	#Sweep	Stop 20.000 GHz ~20.2 s (1001 pts)	Log Lin al Track 1 Zoom)	



Configuration WCDMA+NB-IoT-MC-2 (1WCDMA 64QAM+2SA QPSK)

Channel Bendwidth	RBW	Limit	
Channel Bandwidth	(MHz)	(dBm)	
NB: 250 KHz	10	-19.02	
W: 5.0 MHz	1.0		

Port B, Channel Position M







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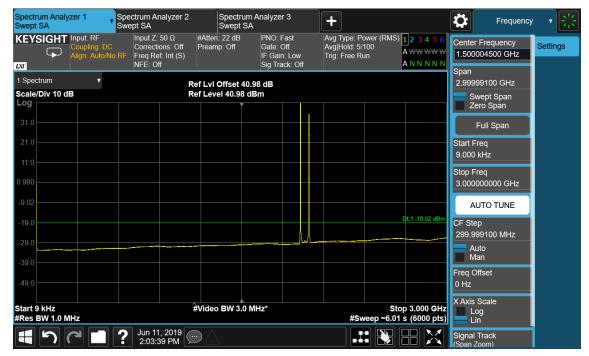
Spectrum Analyzer 1 Swept SA		ept SA	÷	Frequency	- * 崇
KEYSIGHT Coupling: D Align: Auto		IT Gate: Off A	vg Type: Power (RMS) 1 2 3 4 5 6 vg[Hold: 3/100 rig: Free Run A N N N N N	Center Frequency 15.000000000 GHz	Settings
1 Spectrum v Scale/Div 10 dB Log	Ref LvI Offs Ref Level 16		Mkr1 18.80 GHz -44.713 dBm	Span 10.0000000 GHz Swept Span Zero Span	
6.39				Full Span Start Freq	
-13.6			DL1 -19.02 dBm	10.000000000 GHz Stop Freq	
-33.6			â1	20.00000000 GHz	
-43.6	·····			CF Step 1.000000000 GHz Auto	
-63.6				Man Freq Offset 0 Hz	
Start 10.000 GHz #Res BW 1.0 MHz	#Video BW	/ 3.0 MHz*	Stop 20.000 GHz #Sweep ~20.2 s (1001 pts)	X Axis Scale Log Lin	
	Jun 11, 2019			Signal Track (Span Zoom)	



Configuration LTE+NB-IoT-MIMO-MC-1 (1LTE QPSK+1SA QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
NB: 250 KHz	10	10.02	
L: 5.0 MHz	1.0	-19.02	

Port B , Channel Position M, LTE 5.0 MHz





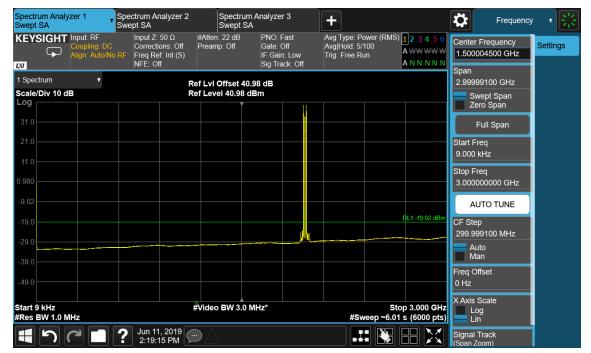


Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyze Swept SA		+	Frequency	· • 😤
KEYSIGHT Input: RF Coupling: D Align: Auto/			Off A	wg Type: Power (RMS) 12 3 4 5 6 wg Hold: 3/100 rig: Free Run A N N N N N	Center Frequency 15.000000000 GHz	Settings
1 Spectrum V Scale/Div 10 dB	R	ef Lvi Offset 46.39 dB ef Level 16.39 dBm		Mkr1 18.80 GHz -44.976 dBm	Span 10.0000000 GHz Swept Span Zero Span	
6.39					Full Span	
-13.6				DL1 -19.02 dBm	10.000000000 GHz Stop Freq 20.000000000 GHz	
33.6				<u> </u>	AUTO TUNE	
-43.6 -53.6			~~~~r		CF Step 1.000000000 GHz Auto	
-73.6					Man Freq Offset 0 Hz	
Start 10.000 GHz #Res BW 1.0 MHz		#Video BW 3.0 MHz*		Stop 20.000 GHz #Sweep ~20.2 s (1001 pts)	X Axis Scale Log Lin	
1 7 7	Jun 11, 2019 2:05:36 PM				Signal Track (Span Zoom)	

Configuration LTE+NB-IoT-MIMO-MC-2 (1LTE QPSK+2SA QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
NB: 250 KHz	10	-19.02	
L: 5.0 MHz	1.0		

Port B , Channel Position M, LTE 5.0 MHz



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Configuration WCDMA+LTE+NB-IoT-MIMO-MC-1 (1WCDMA 64QAM+1LTE QPSK+1SA QPSK)

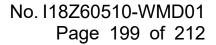
Channel Bandwidth	RBW	Limit
	(MHz)	(dBm)
NB: 250 KHz		
W: 5.0 MHz	1.0	-19.02
L:5.0 MHz		



Port B , Channel Position M, LTE 5.0 MHz









Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA			Frequency	- * 米
KEYSIGHT Coupling: DC Align: Auto/N	Corrections: Off Pre	ten: 6 dB PNO: Fa: eamp: Off Gate: Off IF Gain: I Sig Track	Avg Hold: 3/100 Low Trig: Free Run	A WW WW W A N N N N N	Center Frequency 15.000000000 GHz	Settings
1 Spectrum Scale/Div 10 dB Log		₋vl Offset 46.39 dB _evel 16.39 dBm		1 18.78 GHz -44.559 dBm	Span 10.0000000 GHz Swept Span Zero Span	
6.39					Full Span	
-13.6					Start Freq 10.000000000 GHz Stop Freg	
-23.6					20.000000000 GHz	
-43.6				1	CF Step 1.000000000 GHz	
-53.6					Auto Man	
-73.6					Freq Offset 0 Hz X Axis Scale	
Start 10.000 GHz #Res BW 1.0 MHz	1 Ive 44, 0040	deo BW 3.0 MHz*	#Sweep	Stop 20.000 GHz -20.2 s (1001 pts)	Log Lin	
	3:02:38 PM	\bigtriangleup			Signal Track (Span Zoom)	

Configuration WCDMA+LTE+NB-IoT-MIMO-MC-2 (1WCDMA 64QAM+1LTE QPSK+2SA QPSK)

RBW	Limit
(MHz)	(dBm)
1.0	-19.02
	(MHz)

Port B , Channel Position M, LTE 5.0 MHz

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	+	Frequency	- 光
KEYSIGHT Coupling: D Align: Auto/	C Corrections: Off Prea	en: 22 dB PNO: Fast mp: Off Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) 1 2 3 4 5 6 Avg Hold: 6/100 A WWWW Trig: Free Run A N N N N N	1.500004500 GHz	Settings
1 Spectrum v Scale/Div 10 dB		l Offset 40.98 dB vel 40.98 dBm		2.99999100 GHz	
Log 31.0				Zero Span Full Span	
21.0				Start Freq 9.000 kHz	
0.980				Stop Freq 3.00000000 GHz	
-9.02			DL1 -19.02 dBm	AUTO TUNE	
-19.0 -29.0				CF Step 299.999100 MHz	
-39.0				Man Freq Offset	
-49.0 Start 9 kHz	#Vide	eo BW 3.0 MHz*	Stop 3.000 GH	0 Hz X Axis Scale	
	Jun 11, 2019		#Sweep ~6.01 s (6000 pts		



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Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyz Swept SA	er 3 🕂		Frequency	· ↓ 器
KEYSIGHT Input: RF Coupling: I Align: Auto	C Corrections: Off P				Center Frequency 6.500000000 GHz Span	Settings
1 Spectrum v Scale/Div 10 dB Log		Lvi Offset 42.00 dB Level 16.00 dBm		Mkr1 3.924 GHz -38.745 dBm	7.00000000 GHz	
6.00					Full Span	
-14.0				DL1 -19.02 dBm	3.000000000 GHz Stop Freq	
-24.0					AUTO TUNE	
-44.0		~~~~~	\mathcal{M}	L	CF Step 700.000000 MHz Auto	
-64.0					Man Freq Offset 0 Hz	
Start 3.000 GHz #Res BW 1.0 MHz	#V	ideo BW 3.0 MHz*		Stop 10.000 GHz #Sweep ~14.1 s (1001 pts)		
	Jun 11, 2019 3:18:39 PM				Signal Track (Span Zoom)	





A.5 Radiated Spurious Emission

A.5.1 Reference

FCC CFR 47 Part 2, Clause 2.1046 FCC CFR 47 Part 24, Clause 24.232 (a) (d) RSS-133, Clause 6.5

A.5.2Method of measurement

The measurements procedures in TIA-603-E: 2016 are used. This measurement is carried out in semi-anechoic chamber.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the measurement antenna in both horizontal and vertical polarizations.

Emissions identified within the range 30MHz to 22GHz were then formally measured using a peak detector as the worst case.

The limits for outside a licensee's frequency band(s) of operation the power of the spurious emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - (43 + 10Log (P)) dB

Where:

Field Strength is measured in $dB\mu V/m$

P is measured Transmitter Power in Watts

The EUT was measured with the antenna height varied between 1 and 4 m with the turn table rotated between 0 and 360 degrees. The emission of any outside a licensee's frequencies within 20dB of the limit were measured with the substitution method used according to the standard. The measurements were performed at a 3m distance unless otherwise stated.

A.5.3 Measurement limit

The field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipoles as per 2.1053 (a).

 $E_{(v/m)}=(30 \text{ x } G_i \text{ x } P_o)^{0.5} / d$

Where

Gi is the antenna gain of ideal half-wave dipoles,

 P_{o} is the power out of the transceiver in W,

d is the measurement distance in meter.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

 $E_{(v/m)}=(30 \text{ x } 1.64 \text{ x } 16.56)^{0.5} / 3 = 9.51 \text{V/m} = 139.57 \text{ dB}\mu\text{V/m}$

As per 24.238 (a) the spurious emission must be attenuated by $43 + 10\log(Po) dB$ this gives:

43 + 10log(16.56) = 55.19 dB

Therefore the limit at 3m measurement distance is:

139.57 – 55.19 = 84.4 dBµV/m

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following results.



A.5.4 Measurement results

Configuration WCDMA-1C :

Maximum Output Power 52.0dBm

Channel Position	Channel Frequencies
Channel Position B	1932.4MHz
Channel Position M	1962.4MHz
Channel Position T	1992.6MHz

No emissions were detected within 20dB of the limit.

Configuration WCDMA-2C:

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies
Channel Position M	1932.4 MHz +1992.6MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-1C:

Maximum Output Power 52.0dBm, 10MHz Bandwidth,

Channel Position	Channel Frequencies
Channel Position B	1932.5MHz
Channel Position M	1962.5MHz
Channel Position T	1992.5MHz

No emissions were detected within 20dB of the limit.

Configuration NB-IoT-GuardBand-1C:

Maximum Output Power 52.0dBm ;

Channel Position	Channel Frequencies
Channel Position T	1990.0MHz

No emissions were detected within 20dB of the limit.

Configuration NB-IoT-Standalone-1C :

Maximum Output Power 52.0dBm ;

Channel Position	Channel Frequencies
Channel Position T	(NB)1994.8MHz

No emissions were detected within 20dB of the limit.



Configuration WCDMA+LTE-MIMO-MC-1:

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies
Channel Position M	(W)1932.4MHz+(L)1992.5MHz

No emissions were detected within 20dB of the limit.

Configuration WCDMA+NB-IoT-MC-1 :

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies
Channel Position M	(NB)1930.3MHz+(W)1992.6MHz

No emissions were detected within 20dB of the limit.

Configuration LTE+NB-IoT-MC-2:

Maximum Output Power 52.0 dBm;

Channel Position	Channel Frequencies
Channel Position B	(NB)1930.3MHz+(L)1940.0MHz+(NB)1949.8MHz
Channel Position M	(NB)1952.7MHz+(L)1962.5MHz+(NB)1972.3MHz
Channel Position T	(NB)1975.2MHz+(L)1985.0MHz+(NB)1994.8MHz

No emissions were detected within 20dB of the limit.

Configuration WCDMA+LTE+NB-IoT-MC-2

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies
Channel Position B	(NB)1930.3MHz+(W)1937.4MHz+(L)1942.5MHz
	+(NB)1949.8MHz
Channel Position M	(NB)1952.7MHz+(W)1960.0MHz+(L)1965MHz+(
	NB)1972.3MHz
Channel Position T	(NB)1975.2MHz+(W)1982.4MHz+(L)1987.5MHz
	+(NB)1994.8MHz

No emissions were detected within 20dB of the limit.

Configuration WCDMA-6C:

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies			
Channel Position M	1932.4 MHz +1937.4 MHz +1942.4 MHz			
	+1982.6 MHz +1987.6 MHz +1992.6			
	MHz			

No emissions were detected within 20dB of the limit.



Configuration LTE-MIMO-6C:

Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies		
	1932.5 MHz +1937.5 MHz +1942.5 MHz		
Channel Position M	+1982.5 MHz +1987.5 MHz +1992.5		
	MHz		

No emissions were detected within 20dB of the limit.

Configuration WCDMA+LTE-MIMO-MC-3:

Maximum Output Power 52.0 dBm ;

Channel Frequencies		
(W)1932.4 MHz +(W)1937.4 MHz +(W)1942.4 MHz		
+(L)1982.5 MHz +(L)1987.5 MHz +(L)1992.5		
MHz		
-		

No emissions were detected within 20dB of the limit.

Configuration LTE+NB-IoT-MC-3:

Maximum Output Power 52.0 dBm;

Channel Position	Channel Frequencies
Channel Position M	(NB)1952.7MHz+(NB)1972.3MHz
	+(L)1957.5MHz+1962.5MHz+1967.5MHz

No emissions were detected within 20dB of the limit.

Configuration WCDMA+LTE+NB-IoT-MC-3:

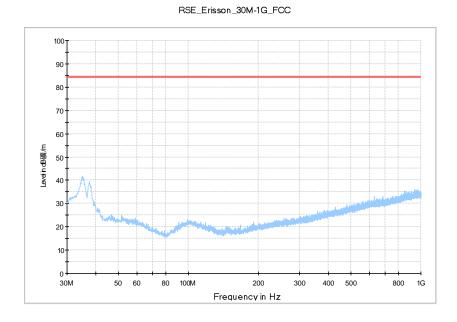
Maximum Output Power 52.0 dBm ;

Channel Position	Channel Frequencies		
Channel Position M	(NB)1930.3 MHz +1935.8 MHz +(W)1960.0 MHz		
	+1965.0 MHz +(L)1987.5 MHz+1992.5 MHz		

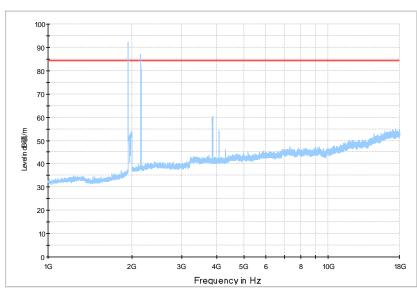
No emissions were detected within 20dB of the limit.



Channel Position M-30MHz-1GHz



Channel Position M-1GHz-18GHz



RSE_Erisson_1-18G_FCC



Channel Position M-18GHz-22GHz



Remarks

The EUT does not exceed -13dBm / $84.4dB\mu$ V/m at the measured frequencies.



A.6 Frequency Stability

A.6.1 Reference

FCC CFR 47 Part 2, Clause 2.1055 FCC CFR 47 Part 24, Clause 24.235 RSS-133, Clause 6.3

A.6.2 Method of measurement

Temperature Variation

The EUT was tested over the temperature range -30°C to +50°C in 10°C steps with 120V AC Power Supply. At each temperature step, the Base Station was configured to transmit an [RAT]* at maximum power on the middle channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal values of 120V AC. At +20°C, the Base Station was configured to transmit an [RAT]* at maximum power on the bottom, middle and top channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]*:

WCDMA - Single Carrier with 64QAM modulation LTE (5.0 MHz) - Test Model E-TM1.1 Single Carrier with QPSK modulation NB-IoT - QPSK modulation

A.6.3 Measurement limit

FCC: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.

ISED: ±1.0 ppm



A.6.4 Measurement results

Frequency Error – Temperature Variation Configuration WCDMA-1C,64QAM,Port A

Maximum Output Power 44.8dBm per port, Channel Bandwidth 5MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
AC(V)		position B	position M	position T
	-30	0.55	0.67	0.57
	-20	0.49	0.51	-0.53
	-10	-0.47	0.47	-0.50
	0	-0.66	0.57	-0.63
120	10	0.73	-0.75	-0.74
	20	0.80	0.86	-0.79
	30	-0.86	0.87	0.89
	40	-0.90	0.94	-0.96
	50	1.00	1.03	-1.02

Configuration LTE-1C,QPSK,Port A

Maximum Output Power 44.8dBm per port, Channel Bandwidth 5MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
AC(V)		position B	position M	position T
	-30	-1.14	-1.15	1.10
	-20	1.10	-1.13	-1.05
	-10	1.03	1.01	-1.06
	0	1.22	1.31	-1.32
120	10	-1.33	1.31	1.34
	20	1.02	1.11	1.08
	30	1.18	1.20	1.16
	40	-1.14	-1.24	1.24
	50	-1.10	1.12	-1.11



Configuration NB-IoT-Inband-1C,QPSK,Port A

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
AC(V)		position B	position M	position T
	-30	-4.26	-4.25	-4.35
	-20	-4.45	-4.47	-4.50
	-10	-4.49	-4.48	-4.51
	0	-4.63	-4.62	-4.71
120	10	-4.70	-4.73	-4.80
	20	-4.87	-4.90	-4.85
	30	-4.98	5.00	-4.96
	40	-5.00	-5.08	-5.02
	50	-5.08	-5.12	-5.08

Configuration NB-IoT-Guardband-1C,QPSK,Port A

Maximum Output Power 44.8dBm per port, Channel Bandwidth 10MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
AC(V)		position B	position M	position T
	-30	-	1.42	-
	-20	-	-1.37	-
	-10	-	-1.23	-
	0	-	-1.21	-
120	10	-	1.24	-
	20	-	-1.26	-
	30	-	-1.31	-
	40	-	-1.37	-
	50	-	-1.42	-



Configuration NB-IoT-Standalone-1C,QPSK,Port A Maximum Output Power 43.0dBm per port, Channel Bandwidth 200KHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
AC(V)		position B	position M	position T
	-30(A)	-1.21	-1.16	-1.21
	-20	1.21	-1.31	-1.23
	-10	1.25	-1.35	-1.27
	0	-1.27	-1.20	-1.32
120	10	-1.33	-1.47	-1.42
	20	-1.43	-1.52	-1.42
	30	-1.42	-1.56	-1.41
	40	-1.39	-1.51	1.38
	50	-1.38	-1.48	1.41

Frequency Error – Voltage Variation Configuration WCDMA-1C,64QAM,Port A Maximum Output Power 44.8dBm per port, Channel Bandwidth 5MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
AC(V)		position B	position M	position T
102	20	-0.83	-0.85	-0.85
120	20	0.80	0.86	-0.79
138	20	-0.87	0.86	-0.86

Configuration LTE-1C,QPSK,Port A

Maximum Output Power 44.8dBm per port, Channel Bandwidth 5MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
AC(V)		position B	position M	position T
102	20	1.03	1.06	1.02
120	20	1.02	1.11	1.08
138	20	1.13	1.00	1.01

Configuration NB-IoT-Inand-1C,QPSK,Port A

Maximum Output Power 44.8dBm per port, Channel Bandwidth 5MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
AC(V)		position B	position M	position T
102	20	-4.87	-4.93	-4.85
120	20	-4.87	-4.90	-4.85
138	20	-4.92	-4.88	-4.84



Configuration NB-IoT-Guardband-1C,QPSK,Port A Maximum Output Power 44.8dBm per port, Channel Bandwidth 10MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
AC(V)		position B	position M	position T
102	20	-	-1.27	-
120	20	-	-1.26	-
138	20	-	-1.24	-

Configuration NB-IoT-Standalone-1C,QPSK,Port A

Maximum Output Power 43.0dBm per port, Channel Bandwidth 200KHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
AC(V)		position B	position M	position T
102	20	-1.32	-1.44	-1.31
120	20	-1.43	-1.52	-1.42
138	20	1.36	-1.57	-1.38



ANNEX B: Accreditation Certificate



END OF REPORT